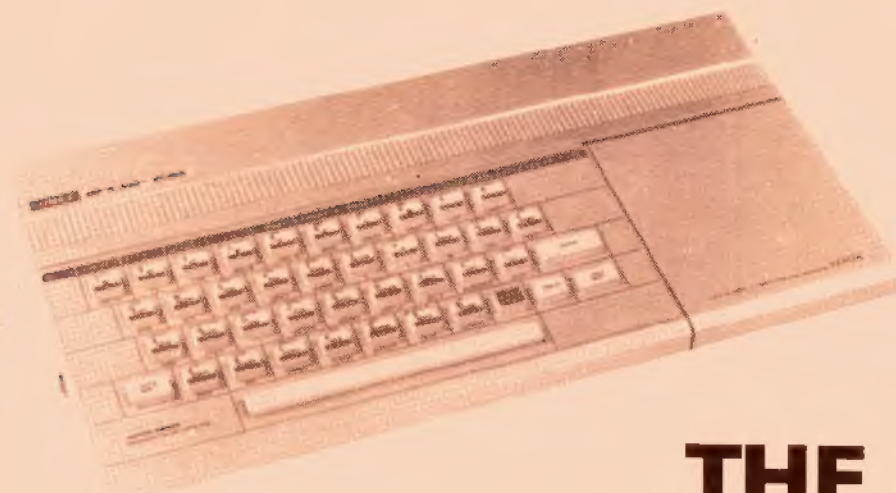


MARCH/APRIL 86
VOL.2 NO.3

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MAGAZINE

MARCH/APRIL 86

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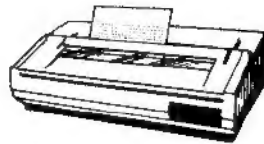
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Editor's Corner

"Do you have back-issues???" This is the most frequently asked question in the correspondence we receive each day. Most of the time, it is asked by a new subscriber who has just received their very first issue of TDM. It is a legitimate question, as even seasoned readers may have noticed the lack of information on back issue availability.

We really don't have that many issues left. In fact, Vol.1, No.1,2, and 4 are all sold out (except for the copies we keep on file). The remaining issues are still in stock, with limited quantities. These include: March/April 85, July/August 85, Sept/Oct 85, Nov/Dec 85, and Jan/Feb 86. All back issues are priced at \$3.00 each ppd. However, I would suggest dropping us a line first, to see what's available, rather than sending off your check.

As I have started to figure out this publishing business a little better, I now order additional stock with each new issue released. This back issue "shortage" should be straightened out in the future. In the meantime, we have plans to produce a compilation of the best articles and programs from Volume One, and call it...you guessed it, "TIME DESIGNS: The Best of Vol.1". This is not an original idea. There are many "best of's", of just about anything. But it does seem to be a solution for those readers who missed out on the earlier issues (and all new subscribers in the future). An exact release date or price has not been set. Some other projects are taking priority over the "Best of Vol.1". I will announce as soon as it is ready.

TIME DESIGNS MAGAZINE CO. will have a booth at the MID-WEST TS COMPUTERFEST, May 3rd and 4th, in Cincinnati, Ohio (see more details in SINCLAIR NEWS section). We will have our magazines, and several "new" items on display. I am planning on attending, and I hope that many of you can make it out there too. It should be a great event. Stop by our booth and say "hello". For those of you who can't make it, we will have complete coverage next issue. Happy Computing!



LETTERS

Direct all correspondence to: The Editor c/o Time Designs
29722 Hult Rd., Colton, OR 97017

The following is an alteration to the GAZER'S GUIDE program in the Nov/Dec 85 issue of TIME DESIGNS, it will eliminate those less accurate results of overhead objects and so on spoken of. Many thanks to I. Auersbacher of Belleville, New Jersey, for his repair.

Paul Bingham
Mesa, AZ

```
5 REM OMIT LET C=.99999 (this
is in line 25 in ver 1.1)
80 LET A=(SIN q*SIN f)+(g*i*j)
85 REM OMIT
100 LET Z=(SIN q-SIN f*SIN (A/D
*PI))/(1+COS (A*PI/D))
105 REM OMIT
115 IF SIN (H*PI/D)>0 THEN LET
Z=360-Z
180 REM OMIT
```

"In the Jan/Feb issue of TIME DESIGNS, Paul Bingham asked whether he won the prize for answering a question I posed in another publication more than a year ago. The answer is no. The date Paul displayed in his output from the Spectrum program "ASTRONOMER" is not the date I mentioned. He also didn't explain the astronomical significance of the date to which I referred.

Paul's review of "Astronomer" was, however, right on target when he said it was accurate. I have compared the output of this little \$15.00 program with the output of astronomy software that costs up to \$130.00 and found it to be in excellent agreement.

The speed of "Astronomer" is comparable to similar IBM and Apple astronomy software. TELLSTAR, an IBM program with similar features, takes 2 1/2 minutes to calculate the positions of 250 stars. STAR TRACK, an Apple astronomy program, takes 9 minutes to plot 863 stars. The 11 minutes taken by astronomer to plot its 1090 stars is just as quick with its 1 minute per 100 stars calculation rate.

"Astronomer" is the best astronomy software value available for any computer. I feel qualified to make such an assertion. In the last 2 1/2 years I have reviewed over 40 different astronomy software programs for Apple, Commodore, IBM, T/S 1000-2068, and Spectrum computers for the Southeastern Planetarium Association and the International Planetarium Society. It's the best I have seen in all respects except speed."

Duncan R. Teague
Past President,
Southeastern Planetarium Assn.

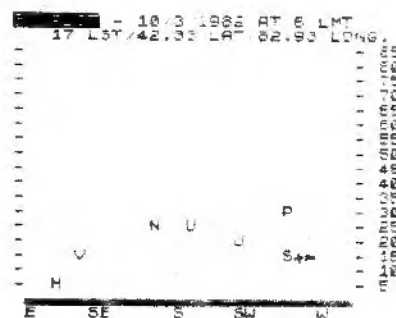
EDITOR: Duncan, the following letter arrived in the mail shortly after yours did. I believe it contains the answer you are looking for.

"I have sent along some things of interest related to Paul Bingham's piece on ASTRONOMY in Jan/Feb 86. He shows that on March 10, 1882 a close grouping of planets occurred. Co-incidentally, on March 10, 1882 the world survived (whew), the so-called "Jupiter Effect" when all nine planets were inside a 95 degree heliocentric sector. Other close groupings were and will be on May 28, 987 at 66 degrees and May 19, 2161 with the planets in a 69 degree sector between Saturn and Neptune.

The print-outs are done with the well-known SKYPLOT by Eric Burgess and the rest by Bob Moler of Traverse City, Michigan, who has written a number of fine astro-programs for the T/S 1000. The Hi-Res print-outs are done using CALLISTO'S "GRAPHICA" and are direct screen copies. Not bad for ZX/TS eh?

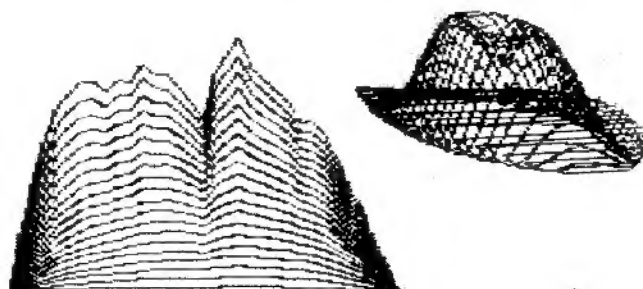
M. R. Richardson
Windsor, Ontario
Canada

EDITOR: Not bad at all! Let us know what your small prize is when you collect from Mr. Teague for supplying the correct info about March 10, 1882.



ENTER DATE (MMDDYYYY)
MAR 10, 1882

PLANET	LONGITUDE	DIST. (AU)
MERCURY	262.76384	0.465100
VENUS	193.13038	0.721300
EARTH	169.0946	0.993110
MARS	180.801	1.650006
JUPITER	211.88659	5.441660
SATURN	197.94695	9.559000
URANUS	241.70618	19.196620
NEPTUNE	265.06603	30.27261
PLUTO	285.79805	29.952690



"The use of RADIO SHACK Thermal Paper, Cat. No. 26-1332 (2 rolls for \$3.95), is recommended for programs submitted for publication. Used in the TS2040 or Alphacom 32 Col. printers, it has much better reproduction capabilities, and the printing will not rub off like it does with the Timex thermal paper.

The following are changes to improve the Text Entry program Figures No.3 and 4 of my article ADVENTURES IN THE RAM JUNGLE AND OTHER MYSTERIES (CONCLUSION) on pages 11 and 12 of the Jan/Feb 86 issue:

Due to the type of keyboards used on the T/S 1000 and 1500, to avoid undesired spaces in the text using the program in Fig. No.3, page 11, add the following line:

```
75 IF D=0 THEN GOTO 60
```

As this adds 16 bytes to the program, change line 33, right column, page 12 to read:

```
POKE 16388, 226
```

and change line 10 of figures 3 and 4 to read:

```
10 LET A=17635
```

Earl V Dunnington
Boynton Beach, FL

"Douglas Jeffery's statement of not getting past the first set of rooms in the MOUNTAINS OF KET reminded me of the experience I had with the HAUNTED MANOR program which I got out of "Family Computing" magazine. I could never get to the final solution of the game. I looked over their listing and my listing, and found no differences. From going over the listing I figured out the correct sequence of rooms, but, in entering them I didn't get the solution. The solution depended on the INT(SQ) of numbers held in a DATA statement. The room number for the correct solution was 26. The DATA statement held the number 676 which is the square of 26. My 2068 would give the correct square root of 676, but, when I called for the INT(SQ) it gave me 25. I had to change the number to 687 to get the solution I found that flaw just after my 2068 returned from Timex and my extended warranty ran out the next week.

I feel that I must make further comment on Duncan Teague's review of the MACHINE CODE TUTOR. There are a number of things he didn't say about it. Explanations of what the computer does are nothing more than the mnemonics in longhand. You are limited to only specified addresses in setting up a program. These are the character generator, the display and attribute file, and less than 200 bytes in higher memory. You are limited to only 15 lines for your program. And, if you write a program on it, there is no way to save it. The program cannot be broken out of. You must turn off the computer."

James F. Brezina
Elmhurst, IL

EDITOR: Don't send your 2068 in for repair. I tried out your example, and the computer gave the same results as yours did. The "flaw" is a permanent resident of ROM.

"First, I wish to extend my thanks for continuing the publication of TIME DESIGNS, and for the improvements offered to the reader each issue. It is products like yours that have helped us stay enthused with our computers.

Second, I would like to suggest a subject that needs coverage for us computer buffs, PRINTERS. Not a review of a product to tell how well it works, but articles on how they work, how interfaces work, and how programs need to be organized to make it all work together.

Consider the fact that now there are many used (mostly dot matrix) printers on the market with perhaps little or no documentation available. These may be all some of us can afford to advance from the 2040 printer.

Or those of us who have full sized printers, but poor documentation as far as actual program examples are concerned. Yes, we have word processor programs that only need to be told what we desire in the way of type size, or margins, or many other variables, and the printer does it. But consider we wish to put all of those operations in our own programs. What are the steps required to get beyond simple LPRINT and LLIST?

A specific example will show my quandary. An A&J interface, an Olivetti 2300 printer, and the OS64 cartridge program. The OS64's short manual explains how to put a margin control into a program "if you know the printer code", which I don't because the printer manual doesn't give it. The A&J print driver software provides margin control, but the two programs don't merge. How do I determine that mysterious group of printer codes to give margin control? It is there somewhere, because word-processor programs do it.

Hopefully, you have a group of writers somewhere who can and will provide the information for various popular printers and interfaces. I am sure that there are many readers who would like to know how these things are done. I would like to be able to work my printer to its maximum capability...not only words, but graphics and column printing. I suspect that some printers can do more than what is described in the manuals."

Dick F. Wagner
Canby, Oregon

EDITOR: Dick, your letter typifies many letters that we have received concerning printers, interfaces, and their associated software. Ah, the "good ol' days", when the Sinclair computer was synonymous with the ZX or TS2040 printer. Now with several full-size printer interfaces on the market, in addition to many brands and types of printers available to the TS user, it has opened the proverbial "can of worms". Starting in this issue, TIME DESIGNS will begin to address the many different problems and solutions to printer/interface/software combinations. If any readers have properly trained their printer beast, I would urge them to come forward, and share their secret to success.

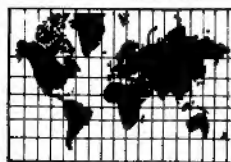
"I have just received my second issue of TDM. Three cheers!...(or should it be at least 2068 cheers?). You can be proud of your publication. It has the basic elements that the other Sinclair orientated publications should have. You have a nice variety of material, interesting articles written by literate writers, the print is readable and the bonus plus...you do keep a schedule of publication.

I either have or do subscribe to most of the TS Computer magazines. Usually, I am suprised when the publication arrives and often disappointed by mini-print and a rehash of old news. Keep up the good work!

I am planning to spend a month in Scotland this Summer. I would like to take my 2068 with me. I tell my wife that I need it to store travel information, but the truth is that I just don't want to spend a month without my computer. Can I run the 2068 in Britain if I purchase a power supply there?

Byron DeFries
Bonduel, WI

EDITOR: Thanks for the encouragement. Your 2068 will operate "over-seas" with a proper AC adapter, which you should find in one of the electronic shops in Scotland. The basic difference will be the step-down transformer (50 Hz, as opposed to our 60 Hz AC). The adapter must have the same 15 volt 1 amp (unregulated DC) rating as the stock 2068 power supply, and the same power plug configuration.



SINCLAIR NEWS NETWORK

MID-WEST TS COMPUTERFEST OPENS MAY 3rd

Why are hundreds of Timex/Sinclair (and Sinclair) users gathering in Cincinnati, Ohio, on May 3rd and 4th, and coming from as far away as B.C.-Canada, California, Oregon, Texas, Florida, and New York? The reason? The MID-WEST TS COMPUTERFEST, being held at the RAMADA INN of Sharonville (a suburb of Cincinnati). This is the first major gathering of TS enthusiasts since the ZX/TS Celebration in Boston, Massachusetts, on October 22, 1983.

What's in store for those attending the Computerfest? Over 15 Sinclair vendors and related services will be on hand to demonstrate their wares. Some displays by vendors who are unable to attend will be staffed by volunteer Computerfest personnel. Two adjoining rooms at the convention facilities of the Ramada Inn will house all of the displays. A separate hospitality area has been reserved.

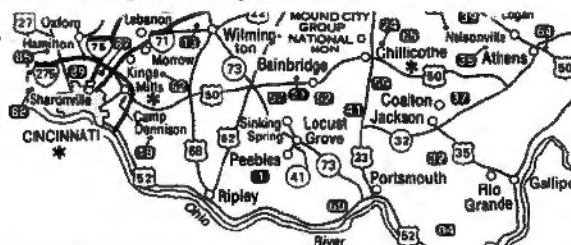
TS Computerfest officials told TIME DESIGNS that to date, the following vendors have reserved display space: E. Arthur Brown Company, Russell Electronics, Aerco, Zebra Systems Inc., Damco Enterprises, Knighted Computers, Time Designs Magazine Co., The TS Connection, TS Horizons, SUM Magazine, Foote Software, Thomas B. Woods, Syncware News, and JRC Software. Absentee Dealers thus far, are: Curry Computer, RMG Enterprises, Budget Robotics and the English Micro Connection. Three large users groups from Cincinnati, Columbus, and Cleveland, will have display booths. Other users groups from out of state may also be represented.

To give a "sneak preview", Aerco will reportedly have their FD-68 Disc Interface up and running in CP/M mode. Zebra Systems will have the largest area, including their own hospitality suite. Zebra will have their new FD-3000 Portugal Disk System operating both in CP/M and Spectrum modes (WORDSTAR and MICROSOFT BASIC on the 2068?!?). A technician from the TS Connection will be repairing faulty Sinclairs and available for

questions. A planned program of demonstrations and guest speakers will continuously run the course of the Computerfest. Invited speakers include Thomas B. Woods discussing his Pro/File programs, and Randy and Lucy Gordon demonstrating the fine art of modeming and telecommunications.

The Mid-West TS Computerfest is the "brain child" of Frank Davis from Indiana. A volunteer committee of 13 individuals have planned the event (some traveling as far as 150 miles to make the Sunday afternoon meetings). Jack Roberts (of TS Connection fame), is the Executive Coordinator, and can be contacted for further details by writing to: The Mid-West TS Computerfest, 3832 Watterson Ave., Cincinnati, OH 45227. Tickets for the Computerfest may be purchased in advance by writing to the above address.

All in all, the Mid-West Computerfest is reported to have "a little something for everyone"...whichever machine you use; ZX81, 2068, or Quantum Leap. With the reasonable airline rates and gasoline prices, attendance should be quite good. After all, aren't most Sinclair users looking for a good deal, or a new programming trick?



WHAT'S NEW?

Reported by R. Lussier

The NEW British version of the Spectrum 128K computer now seems to be ready. A consignment of 3000 of these units were shipped via a route thru Tokyo, Japan, to a company called MCK Freight. They are agents for Sinclair Research in Cottenham, Cambridge.

These new Spectrum 128Ks are apparently being built by old T/S 2068 "buddies"... Samsung in Seoul, South Korea. The computers are intended to form a basis for a "stockpile" of the new models prior to the proposed UK launch in the early part of 1986. Samsung are now also producing the Spectrum



New Spectrum 128K has Dual-Operating Modes and an external keypad attached via a coiled telephone cable.

Plus and the QL for sale in the far east.

TASWORD THREE will be the new version of the best word processor for the Spectrum to date. However, the new program will only be available on Microdrive cartridges, and not on cassettes. This is bad news for those not having a Microdrive unit. This new version will have up to 128 columns, improved find and replace, a proper insert mode that automatically inserts and rejustifies as text is typed, and user defined TABS. Also included are auto page-numbering, multiple copies, and printing of Header and Footers. There are now a few other word processors coming out...one is called WORD MANAGER from OCP, and is claimed to be as good as Tasword Two, if not better. Another is THE WRITER from SOFTEK. This program is a re-vamped version of SPECTRAL WRITER (program that comes with the Wafadrive). The Writer, I am told, will be able to read and write WORD-STAR files, allowing the user to send files to the office computer by RS232 link.

A new newsletter related to ASTRONOMY type information and tends to most computers including the ZX81/1000-15000 and 2068, is available from: Computer Astronomy Network, 20 Helen Street, Warren, NJ 07060. Rates for this newsletter are \$3.00/six issues, or 50¢ each.

If you have a QL, and would be interested in a copy of a LISTING for a GRAPHICS TOOLKIT, then send a S.A.S.E. to me at the following address: 7937 Elwell St., Burnaby, B.C., Canada V5E 1M3.

The techniques of this new toolkit are similar to those used by Walt Disney Prod. to create the movie TRON. You can experiment with "Fractrals". This is the replication of natural shapes to form landscapes, rock formations and buildings. The toolkit listing was done by a professional programming team, and took two months to complete.

PRODUCT NEWS

SILICON MOUNTAIN COMPUTERS, C-12, Mtn. Stn. Group Box, Nelson, BC, Canada V1L 5P1, has a software/hardware catalog for the ZX81 (and T/S 1000/1500). How about true 64-col. screens and hi-res color (reportedly better than the 2068) for your ZX/TS?

A SAMS COMPUTERFACT (Howard Sams Co., 4300 W. 62nd St., Indianapolis, IN 46268) has been released for the T/S 1000 and ZX81. A Computerfact is technical service documentation including schematic diagrams. The package costs \$19.95 and is available by calling 1-800-428-SAMS.

A hardware catalog for TS computers is available from BYTE-BACK, INC., RT 4 Box 54, Leesville, SC 29070. Their latest new device is the REAL TIME CLOCK, \$79.95 for T/S 1000 and 2068 versions. Add \$4.95 for p&h.

New computer SERVICE DEPT. at SUNSET ELECTRONICS (2254 Taraval Street, San Francisco, CA 94116, (415) 665-8330). All Timex and Sinclair computers are repaired at very reasonable rates.

JRC Software, PO Box 448, Scottsburg, IN 47170, would like to send you their brand new 2068 catalog for \$2.00. Actually, the "catalog" is a cassette tape, and includes several free software programs.

RAMEX (17620-26 Mile Rd., Washington, MI 48094) announced they are discontinuing support for the 2068 and manufacturing of their Millennia K (SPDOS) Disk Systems. Instead, they have opted to support the Sinclair QL and IBM related products. (Anyone want to buy the manufacturing rights to the SPDOS? It's up for sale.)

VENDOR BEWARE: Small Digital Systems, 2089 Chatsworth Blvd., Ste.4, San Diego, CA 92107. A reader brought to our attention that this company has vanished into "thin air" (Vaporwares). Earlier they had placed ads in the COMPUTER HOT LINE for TS utility programs.

NOTICE

Apologies go to Warren Fricke, for our inadvertently leaving out some very important lines of his LOLLIPOPS program published in the JAN/FEB 86 issue. Here are the missing lines, and will now make this nifty little game operational:

```
495 PRINT AT 13,0;
" BUT BE CAREFUL. IT'S A NO-NO T
OTASTE THE PEPPERMINT, "; BRIGHT
1; PAPER 7; " "
500 PRINT AT 17,0; "PRESS "; FLA
SH 1; " ENTER "; FLASH 0; " TO STA
RT THE GAME."
510 INPUT Z$: GO TO 30
```


PROGRAMMING IN SuperBASIC™ FOR THE T/S 2068 PROGRAMMER

by Mike de Sosa

As I suggested in the last issue, the most enduring contribution of the Sinclair QL™ system may turn out to be SuperBASIC. Many experts hold that SuperBASIC is the best BASIC language available on a microcomputer, and the dialect that most closely conforms to ANSI-85 BASIC standards. SuperBASIC, combined with other recent innovations may eliminate the present need for several more advanced (and more difficult) artificial languages.

Timex/Sinclair 1000 BASIC is a true subset of T/S 2068 BASIC--with few exceptions, programs written for the former machine will run on the latter--the same cannot be said for the 2068 BASIC and SuperBASIC. Though similar in many respects--some of which may confuse the T/S 2068 programmer at first--they differ markedly.

Gone are the smart cursor and single-keystroke keywords. There is only one type of cursor, and most SuperBASIC keywords must be spelled out. The SuperBASIC interpreter recognizes about 175 keywords, the T/S 2068 interpreter about 110. The following T/S 2068 BASIC keywords are affected in one way or another, either omitted or changed in meaning or usage: ATTR, BIN, BRIGHT, BORDER, CAT, CLOSE, COPY, DELETE, DEF FN, DRAW, ERASE, FOR, FREE, IF, IN, INVERSE, LET, LLIST, LOAD (including LOAD CODE, LOAD DATA, LOAD DATA\$, and LOAD SCREEN\$), LPRINT, MOVE, ON ERR, OPEN, OUT, PLOT, POINT, RANDOMIZE, RESET, SAVE (including SAVE CODE, SAVE DATA, SAVE LINE, and SAVE SCREEN\$), SCREEN\$, SGN, SOUND, SQR, STICK, STR\$, USR, VAL, VAL\$, and VERIFY. Become familiar with these changes before you start programming.

QL software programs have convenient HELP pages to aid the user. SuperBASIC has none. There is a definite need for a SuperBASIC HELP program on Microdrive cartridge which you could load and refer to during programming, with clear and succinct explanations, comprehensive examples, and numerous suggestions. (I have done some work on this and could aid someone engaged on such a project; contact me through TIME DESIGNS, if interested.)

The main feature of SuperBASIC is its provision for structured programming. (Now in vogue, structured programming is not for everyone, but it may be superior for those given to a little makework in the interest of clarity.) Structured programming may be written using T/S 2068 BASIC, substituting descriptive variable names for subroutine addresses, but SuperBASIC is much more flexible in this regard. We'll return to structured programming in SuperBASIC below, but first some basics.

SuperBASIC makes provision for numeric, string, and integer type variables. The last is designated by a % sign, for example, sum%. The integer variable is not significantly more efficient to use in SuperBASIC than the normal, floating-point numeric variable, but it is there, together with special provisions for integer division. Variable names may be up to 255 characters in length.

Alphabetic comparisons have been rationalized in SuperBASIC: "cat" precedes "DOG" and "A96" precedes "A112".

SuperBASIC incorporates the principle of coercion, accepting string variables in cases where numeric variables are called for and vice versa. This is "user-friendly" in most cases, but could lead to unsuspected errors in mathematical computations, if not taken into consideration. Constructions such as LET a\$ = 242 and b = "242" are now possible (the keyword LET is optional in SuperBASIC).

Channels, Windows, Devices, and Device-Independent Input/Output

To accommodate multi-tasking (running more than one program at a time), SuperBASIC had to be made more complex in certain instances than its predecessors. It had to incorporate the interdependent concepts of channels, windows, devices, and device-independent input/output.

A channel is merely a path between the QL and a built-in or external (peripheral) device, a piece of hardware such as the monitor screen (scr); the console, that is, the combination of keyboard input and screen output (con); a serial port (ser); a network port (netin or neto_n); or a named file on a Microdrive (mdv_filename), floppy disk (fdkn_filename), ram disk (ramn_filename), or hard disk (hdkn_filename). (The n in each instance indicates a device number, for example, mdv1.)

The QL supports 16 channels--#0 to #15--each of which can be used to run and display the data of more than one program at a time. Channels #0, #1, and #2, are dedicated default channels, that is, they are available for specific functions at turn on. These default functions may be altered. The remaining channels are OPENed or CLOSED, as required. This is done in various ways.

Channels #0, #1, and #2, the default channels opened when the QL is turned on, each have their own window (portion of the total monitor screen) and, unless modified by the user, handle and portray input, output, and program listings, respectively. Three separate windows are displayed in monitor mode; in TV mode, channel #1 (output and graphics) and channel #2 (program listings) are superimposed, displaying whichever type of information is last selected. Channel #0 displays command inputs and error signals. Figure 1 shows the QL screen display Monitor and TV modes.

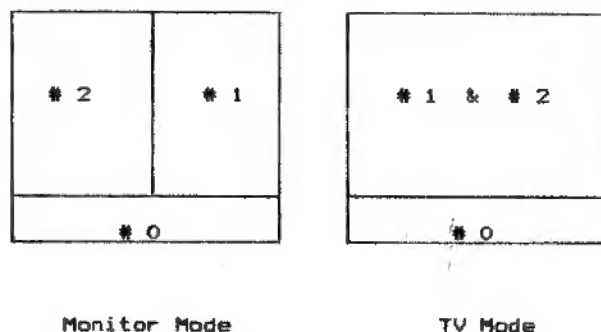
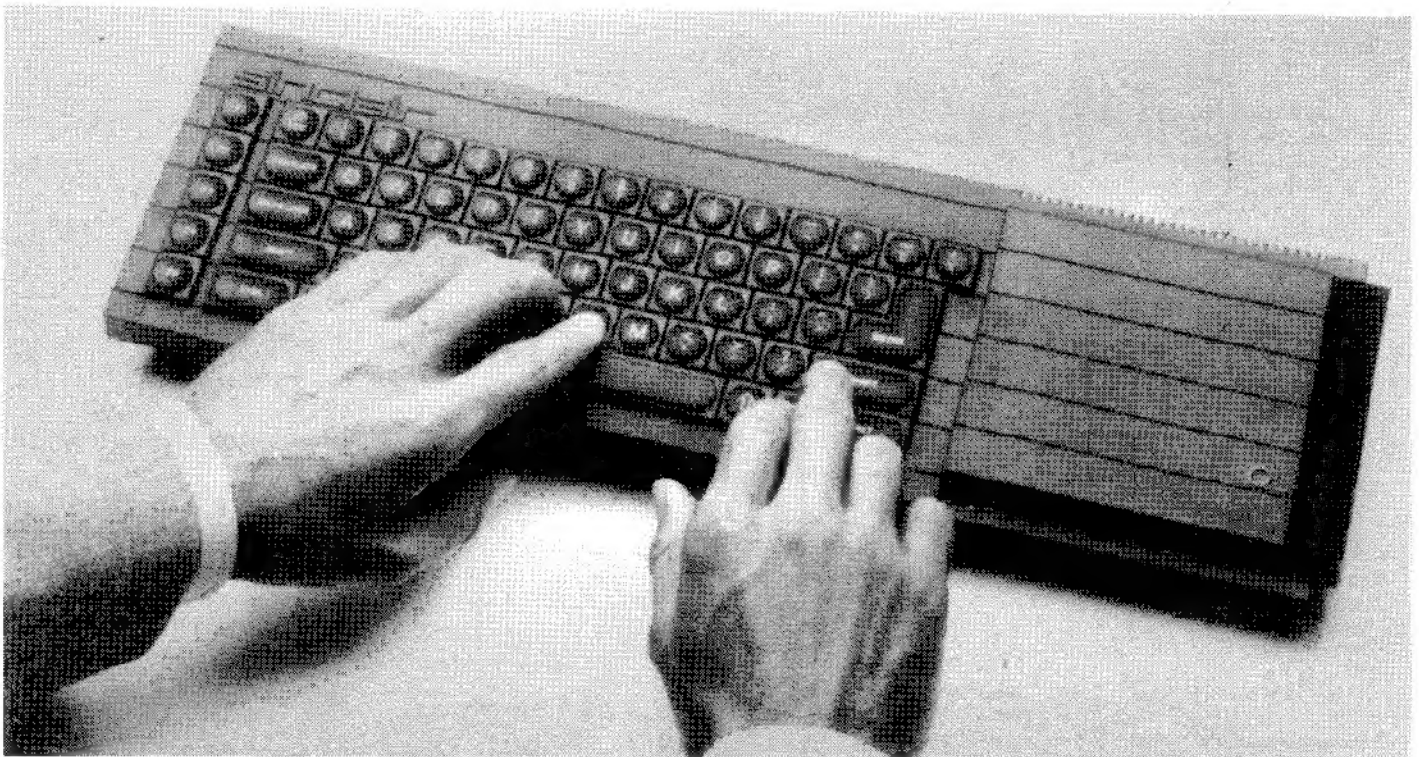


Figure 1. Sinclair QL Screen Displays

In SuperBASIC, a channel may be OPENed to a file, and data later PRINTed to our INPUT from the file; INKEY\$ may be used to input data to the QL from a file one character at a time.

A QL device is a built-in or peripheral piece of equipment to which data may be sent and/or from which data may be received. The QL makes no assumptions about



the ultimate source or destination of data and is thus said to have "device-independent input/output", such data going to or emanating from a logical file. Channels are OPENed and data sent between QL devices in various ways:

- a. OPEN #4, con_448x180a32x16_128
- b. OPEN #6, scr_20x20a0x0
- c. OPEN #3, ser
- d. SAVE ser
- e. OPEN_NEW #5, mdv2_filename
- f. OPEN #5, mdv2_filename
- g. OPEN_IN #5, mdv2_filename
- h. REPEAT inloop: PRINT INKEY#(5)
- i. COPY mdv1_filename TO con
- j. COPY mdv1_filename TO scr
- k. COPY mdv1_filename TO ser
- l. WINDOW 200,100,30,10
- m. WINDOW #3,200,100,30,10

Example a opens channel #4 to the console (keyboard input, screen output) with a 448x180 pixel window whose upper left corner is 32 pixels in, and 16 pixels down from the upper left of the screen; the keyboard type-ahead buffer is set for 128 characters. Example b opens channel #6 with output to a small window at the upper left of the screen; c opens channel #3 to the ser1 port, the default ser port; d commands the sending of a loaded program to the device at ser1 (if a printer, it prints a listing); e opens a new data channel to a Microdrive file; f opens a channel to an existing Microdrive file for input and output; g opens a channel to an existing Microdrive file to input data to the QL; h uses a REPEAT

loop to input data from a Microdrive file, a single letter at a time; i and j will display the contents of a Microdrive file on the screen; K sends the contents of a Microdrive file to the device connected to the ser1 port (if a printer, the file is printed); l directs channel #1 (the output default channel) to display output in a 200x100 window 30 pixels in and 10 pixels down from the upper left of the screen; m directs channel #3 output to a window on the TV or monitor screen. The command CLOSE #n closes a channel.

NEW KEYWORDS

All of the rudimentary BASIC functions are available, for compatibility with other BASIC dialects, but in many cases, the old keyword has been made more flexible (and more complex). For example, CLS, the old clear screen command, may now be used in several ways: its new syntax is CLS [#n][,part of window], and it can be used to clear any part of a designated window.

In addition to the keywords listed above which have been eliminated or changed in meaning or use, there are a great many new keywords in SuperBASIC. So many that space limitations preclude a description of each. What follows is a discussion of various "families" of new SuperBASIC keywords not discussed elsewhere in the article.

About 30 new keywords relate primarily to programming on the QL--greatly enhancing what was already an excellent programmer's language. These new keywords provide for multi-tasking, networking, peripheral use, disk use, editing and renumbering programs (including GOTOS and GOSUBS), managing variables, and better interoperability with machine code segments of complex programs.

About 20 new keywords deal with graphics on the QL, including five basic Turtle Graphics commands which together with SuperBASIC Defined Procedures permit the design of comprehensive Turtle Graphics programs. The graphics scale and character size are variable. There are no keyboard graphics symbols--befitting a "business" machine, but user-defined graphics are possible using your own or commercial software. All in all, SuperBASIC graphics capabilities are limited, but outstanding results are possible using machine code programming.

There are six new print-control keywords and symbols, including a "smart" space, underlining, and printing width control. Character size is variable.

Five new keywords deal with the QL clock, permitting comprehensive clock, calendar, day-of-week, timing, and days-between-dates operations.

Four new math keywords provide for degree-radian conversion and integer division.

The QL sound system is rather primitive (it has only one command which can be used simply or in complex ways). This shows the intent, perhaps, to design a more business like, less game-oriented machine.

SuperBASIC Loops and Branches

FOR...NEXT loops and IF...THEN branches are greatly improved in SuperBASIC:

```
FOR f = 1,3,10 TO 20 STEP 2,25: PRINT f
```

This would print the following numbers in column: 1,3,10, 12,14,16,18,20 and 25; it is an example of the "short form" FOR loop. Note that the control variable has an irregular sequence and that the statement NEXT F is unnecessary. The "long form" FOR loop would look as follows:

```
10 INPUT "High, low, median"; alpha,
    omega, y
20 FOR f = alpha TO omega STEP -.5
30   x = f*y
40   PRINT 1/x
50 END FOR [NEXT f may also be used]
```

Following are examples of the "short" and "long" forms of the IF...THEN construct, in SuperBASIC an IF...THEN...ELSE...END IF construct in which the use of THEN is optional:

```
10 IF a>5: PRINT a: ELSE PRINT "ng"

10 IF a>5 THEN PRINT a: ELSE PRINT "ng"

10 IF a>5 THEN [use of THEN optional]
20   PRINT a
30 ELSE
40   PRINT "ng"
50 END IF
```

Although the "short form" of IF is more economical, the "long form" is advisable if multiple statements and nested FOR and IF loops are used.

A common branching system new to Sinclair BASIC, the SELECT...END Select construct has been added, also in a "short" and "long" form. This construct permits complex choices depending on the value of a select variable.

```
10 SELECT ON a=1 TO 10: print a : "ok"
```

```
10 a = RND(2 TO 12)
20 SELECT ON a
30   = 2 TO 6
40     PRINT "Pay 2 to 1"
50   = 7
60     PRINT "Pay 10 to 1"
70   = REMAINDER
80     PRINT "You lose!"
90 END SELECT
```

Two new types of loop are available in SuperBASIC: a WHEN ERROR...END WHEN loop used in error-trapping and debugging, of which no mention is made in the QLUG, and a REPEAT...EXIT...END REPEAT loop, also in a "short" and "long" form. Examples are as follows:

```
10 WHEN ERROR
20   REPORT
30   PRINT "Error number"; ERNUM;
40   PRINT " at line number "; ERLIN
50 END WHEN
```

Insert these lines anywhere in a SuperBASIC program to report the type and location of the first error encountered in a program; the error number is reported as a negative number corresponding to the error numbers on pages 19 and 20 of the "Concepts" section of the QLUG.

```
10 REPEAT flag: a = RND(1 TO 100);
    PRINT a: IF a > 50 THEN EXIT flag

10 REPEAT guess
20   INPUT "Enter number (1 to 100); n
30   a = RND(1 TO 100)
40   IF a > n THEN
50     PRINT a
60     EXIT guess
70   END IF
80   PRINT "Try again"
90 END REPEAT guess
```

SUPERBASIC PROCEDURES AND FUNCTIONS

The fundamental constructs of SuperBASIC are its Defined Procedures and Functions. Similar in construction--a procedure may often be written as a function and vice-versa--they differ in the way that they are "called" and used in a program. Defined Procedures may be called on their own, that is, alone on a numbered program line; Defined Functions must return a value to an expression.

When called in a program, the actual parameters of a Defined Procedure, if any, must not be enclosed in parentheses; those of a Defined Function must be. The use of a RETURN expression is optional in a Defined Procedure but mandatory in a Defined Function.

The structure of a Defined Procedure or Function begins with the term DEFINE PROCEDURE or DEFINE FUNCTION, which you may key in as DEF PROC or DEF FN, or def proc or def fn for that matter; a name identifier (all SuperBASIC identifiers must begin with an alphabetic character, consist of only alpha-numerics and the underscore character, and be from one to 255 characters in length); and, if required, a list of formal parameters.

To facilitate the use of a library of functions and procedures in any program, formal parameters are considered local variables which refer only to function/procedure use as opposed to global variables which apply throughout the program. In addition to its formal parameters, a procedure or function may specify other LOCAL variables.

The best way to explain SuperBASIC Defined Procedures and Defined Functions is by the use of examples. Listing 1 is a library of these constructs which you should add to and make use of in your programming.

THE MISSING VAL

Sinclair Research states in the QLUG that "coercion" makes the old VAL function unnecessary. This is not true. Recently I had to turn to the T/S 2068 to run a program using the VAL function; I could not figure out how to program around it on the QL. Coercion will not evaluate a numeric expression, and I cannot figure out how to translate one of the most useful short BASIC programs to the QL:

```
10 INPUT "Formula? "; n$
```

```
20 PRINT n$;" = "; VAL n$
```

```
30 GO TO 10
```

The program's output is similar to that of a printing calculator. I'd like to offer the first annual THOMAS B. WOODS award--a cash award of \$10, recognizing a great American Sinclair programmer, to the first reader of

Listing 1. SuperBASIC Procedures & Functions

```
9000 REMARK PROCEDURES & FUNCTIONS
9010 DEFINE FUNCTION SGN(n): IF n>0: RETURN
n/ABS(n): ELSE : RETURN 0
9020 DEFINE FUNCTION CELSIUS(n): RETURN (n-32)*5/9
9030 DEFINE FUNCTION FAHREN(n): RETURN n*9/5+32
9040 DEFINE FUNCTION RND10: RETURN RND(1 TO 10)
9050 DEFINE FUNCTION RND100: RETURN RND(1 TO 100)
9060 DEFINE FUNCTION COMFINT(p,r,t): LOCAL a
: a=p*(1+r/100)^t: RETURN INT(a-p+.5): REMARK
Try FOR t=1 TO 10: PRINT t,COMFINT(p,r,t)
[for table]
9070 DEFINE PROCEDURE LIST953
9080 OPEN #3,ser1
9090 PRINT #3,CHR$(27);CHR$(77);CHR$(9)
9100 PRINT #3,CHR$(27);CHR$(81);CHR$(53)
9110 LIST #3
9120 PRINT #3, CHR$(12)
9130 CLOSE #3
9140 END DEFINE
9150 DEFINE PROCEDURE wscr
9160 WINDOW #0,500,40,4,216: WINDOW #1,500,216,4,0: WINDOW #2,500,216,4,0
9170 PAPER #1,0: INK #1,7: PAPER #2,0: INK #2,4
9180 MODE 4
9190 CLS #0: CLS #1: CLS #2
9200 END DEFINE
```

TIME DESIGNS to come up with a similar program for the QL using 10 or less program statements. In the event of a postmark tie, the award will go to the shortest, most elegant program submitted. Get busy, hackers! You too, Tom.

Next time: "Using QL Software Programs with 640K RAM and RAMdisks".

Review: GRAPHIQL by Vince Lyon

Did you ever meet someone you felt was real special? That one special someone who had all the charm, looks, money and talent God could possibly give to one person. Only later to discover that he/she had one irritating little habit (eating crackers in bed or whatever) that you just couldn't accept. Eventually the irritation grows to the point where it overshadows the charm, looks, money and talent. Well, permit me to introduce you to GRAPHIQL.

GRAPHIQL certainly has a nice personality. It is clean, very versatile, well designed, with many more talents than a cursory look can discover. While not a full CAD system (the QL just isn't equipped to handle 3D graphics), GRAPHIQL certainly pushes the graphics capabilities of the QL to the maximum, with a few new and unique twists.

"Rubber-banding" is one of the most versatile and unusual of the new commands incorporated into GRAPHIQL. Imagine putting pins into a board in any strange configuration you wish and then putting a rubber band around them to outline the shape you wish. That's "rubber banding", and it's a facility that, until now, was available only on the 'high-priced' brands.

GRAPHIQL offers eight colors which can be mixed and printed in textures or solids. One can draw in a free-hand or use the set of commands to create any size rectangle, square, circle or ellipse. Both regular and irregular shapes can be filled with a solid color or texture.

All these capabilities make GRAPHIQL a multi-faceted artists tool.

Now, let's get down to those little irritations. GRAPHIQL is a REAL BEAR to use. As with all of the programs marketed by Sinclair, the window is designed ONLY for a RGB monitor. If you have a TV or a monochrome monitor, that means that only about 2/3 of the screen (canvas) is visible, and none of the on screen commands can ever be seen. It's like working in the dark with something you can't see OR FEEL.

As if that wasn't enough, this is no icon-based program. All commands are entered as a letter or series of letters. If something is entered incorrectly, the QL growls at the user, and just sits there dumbly, waiting for you to correct yourself. As a result, anyone who uses this program, will spend a considerable amount of time with a 63 page manual, trying to find what may be the appropriate command.

If you can live with these minor irritations, and have the time to spend learning the new commands, you may find that to have the ability to draw complex pictures, save them and recall them from a SuperBASIC program, is exactly what you've been looking for (but, then some people don't mind cracker crumbs in their bed).

GRAPHIQL is produced by TALENT COMPUTER SYSTEMS of the U.K. It lists for \$49.95, but is discounted through several American QL dealers. The review copy was obtained from: RMG ENTERPRISES, 1419 1/2 7th St., Oregon City, OR 97045.

OF STRING\$ AND THINGS

by
Earl V. Dunnington

While working up examples for my series of articles "Adventure In The RAM Jungle And Other Mysteries" appearing in the SEPT/OCT 85 through JAN/FEB 86 issues, I came across a curious feature of the TS 1000/1500 concerning un-dimensioned and dimensioned strings, that is not covered in the owner's manual. In some computers there is a built in limit of 255 characters in an undimensioned string. Likewise in a print statement. This is not the case in the Timex/Sinclair computers. However, there is an undefined limit on undimensioned strings that is based on three factors. These factors are: the number of bytes in the program, the size of the available RAM, and the number and size of the other undimensioned variables and strings in the program. In most cases you can store more characters in a dimensioned string than you can in an undimensioned string. In order that those readers with only 2K RAM can obtain the same results, set RAMTOP at 18432 by ENTERing the following direct commands:

```
POKE 16388,0
POKE 16389,72
NEW
```

Now type in Program No.1 as follows:

```
10 FAST
20 LET A$=""
30 LET B$="A"
40 FOR N=1 TO 900
50 LET A$=A$+B$
60 NEXT N
```

RUN the program and when the 4/50 report is given (out of memory), ENTER the direct command: PRINT LEN A\$

You should get 577 as the length of the A\$. To see the string, ENTER the direct command: PRINT A\$

Now change line 50 to read: 50 LET A\$(N)=B\$ This time instead of RUN, ENTER the direct commands:

```
DIM A$(900)
GOTO 30
```

T/S 1000 & 1500



To see the entire string, change line 50 to read: 50 PRINT A\$(N);

ENTER: GOTO 40

When the 5/50 report is given (no more room on the screen), ENTER: CONTINUE

As you can see, we can store many more characters in a dimensioned string. The disadvantage is that the LEN function reports the dimensioned size of the string, not how many characters were actually stored, if less than the dimensioned size. This disadvantage can be overcome by assigning a permanent variable in the program to keep track of the number of characters in the string. For example:

```
55 LET LENAD=N
```

Add line 55 and change lines 40 and 50 to:

```
40 FOR N=1 TO 800
50 LET A$(N)=B$
```

As before, ENTER the direct commands:

```
DIM A$(900)
GOTO 30
```

When the 0/60 report is given, ENTER the direct command: PRINT LEN A\$;

The result will be the length of the dimension, 900. ENTERing: PRINT LENAD will give 800; the actual amount of characters stored in the string A\$. If we never use the variable N again in the program, then we could use N instead of the variable LENAD to keep track of the number of characters.

In his otherwise excellent book "A PRACTICAL GUIDE TO MACHINE LANGUAGE PROGRAMMING ON THE TIMEX/SINCLAIR 1500 AND 1000 (AND ZX81)" (SiriusWare), David B. Wood states on pages 28 and 29, "Note that if you change RAMTOP, but do not execute NEW the upper stacks still operate in their original

locations." In my article "ADVENTURES IN THE RAM JUNGLE AND OTHER MYSTERIES (CONCLUSION)" JAN/FEB 86 issue, we proved that this is essentially correct (with a slight difference of semantics). However, he goes on to say "The only effect will be that the system will not expand lower memory beyond this RAMTOP". This is what I will kindly call a "Jungle superstition" perpetuated by other authors without proof. The lower RAM memory extends from the start of the system variables area to the top of the Calculator stack during the program RUN. E_Line is an address that marks the start of the workspace and spare area. The address of E_Line is stored in the two bytes of the system variable E_Line, 16404 and 16405. The address immediately below E_Line always contains the value 80h (128 decimal). Delete line 55 and change line 40 back to:

```
40 FOR N=1 TO 900
```

Now POKE the system variable RAMTOP to address 17408 without entering NEW:

```
POKE 16388,0
```

```
POKE 16389,68
```

As before, ENTER the direct commands:

```
DIM A$(900)
```

```
GOTO 30
```

When the 0/60 report appears on the screen, find the address of E_Line by PEEKING the system variable E_Line using the direct command:

```
PRINT PEEK 16404+256*PEEK 16405
```

The result displayed on the screen should be 17548. PEEK this address-1 with the direct command:

```
PRINT PEEK 17547
```

The value displayed should be 128. As this is the marker immediately below E_Line and is at address 17547 which is indeed above the address in the system variable RAMTOP, it proves that changing RAMTOP (i.e.; the value stored in the system variable RAMTOP) without executing NEW, DOES NOT stop the lower RAM memory from expanding beyond that changed value. Q.E.D.

As a matter of fact, I have a word-processor that has over 11K bytes of programming and it will operate when the system variable RAMTOP is changed to 17408, without executing NEW. Try it with one of the longer programs in your own library.

To save memory, dimensions, strings, and variables do not have to be in a program line. They can be added to a program with direct commands before saving the program, provided GOTO (not RUN) is used to operate the program. To illustrate this, ENTER NEW and type in the following lines:

```
10 PRINT A
20 PRINT A$
30 INPUT B$
40 PRINT B$
```

Now ENTER the direct commands:

```
DIM B$(5)
```

```
LET A=12
```

```
LET A$="ABCDEFGG"
```

SAVE the program. ENTER NEW to clean the memory. LOAD the program and operate it using GOTO 10. To show that the DIM was recorded, when the cursor appears ENTER more than 5 characters. This feature can also be used for program security as listing the program does not reveal what was added with direct commands.

To me there is nothing more frustrating than waiting several weeks for a new software program and it will not load when it arrives. The tape recorder I normally use with both my 1500 and 2068 is a GE Computer Program Data Recorder Model No.3-5158B. I have only had one problem, other than when the head needs cleaning, recording and loading my own programs. The one exception is with the Speedload Cartridge (Intercomputer) and that was not with the recorder, but with the tape used. You cannot use Radio Shack computer tapes with Speedload. Oddly enough it works with Radio Shack Realistic Low Noise 30 minute audio tapes. Also with KMART Lazer computer tapes as well as Memorex and Maxell UD audio types. The Speedload cartridge works only with either the 16K Rampack or the 2040 printer...not with both at the same time as the cartridge draws too many Amps.

I have had no problems loading Timex, Aerco, Scientific Software, or Bob Berch produced programs. They all load over a wide range of volume control settings.

Most of the software produced by IPC (International Publishing and Software Inc.) sold by Gladstone, is either of poor tapes or produced by bad recording methods. The width of a human hair on the volume control setting determines a successful load. These particular programs have security measures to prevent them from being copied once they have been loaded into the computer. Fortunately, there is a remedy. I borrowed a Realistic CTR-55 recorder from a friend. Connected the Ear output from the CTR to the Mic input of the GE, using a miniplug 40db signal reducer (from Radio Shack- \$2.00) and re-recorded the programs using only battery power. The new back-up tapes load without any problem.

Beginning Z80 Machine Code

by Syd Wyncoop

TIME DESIGNS Editor, Tim Woods, has asked me to write a continuing series on Beginning Z80 Machine Code. I would like to hear from you, what your specific needs are, as well as your suggestions and comments. You can respond direct to me (address at end of article) to avoid delay and extra work for Tim.

We will be developing some machine code (MC) routines to be used as subroutines in a BASIC program. This will aid the learning process, as well as provide a useful goal. I am laboring under the assumption that you already have a good understanding of BASIC. If not, you may wish to master BASIC first, as it is a very powerful programming language all by itself.

You may be asking, "What is machine code, and why would I be interested in learning it?" Your answer may very well be that you are not interested, in which case you need read no further. However, if you are tired of your computer taking a "coffee break" when you ask it to perform some task, you may be interested in how MC can put some speed in your program, and end that coffee break sooner.

What is machine code? Very simply, MC is the "language" understood by your computer's Central Processing Unit (CPU). Each CPU has its own set of instructions which enable it to perform its task as housekeeper, and communicate with the outside world (other devices). These instructions are permanently stored at birth in the CPU, as numbers. We will be studying the Z80, as it is the CPU that Sinclair has chosen to use in our computers.

I called the CPU, "housekeeper", for a reason. The CPU is basically "dumb". It is the "workhorse" in your computer, and can only perform general housekeeping chores. The "brains" of the operation, is the Operating System and Basic Interpreter, which is permanently stored in memory (ROM). Without the operating system, the CPU is even more helpless than a newborn child. The CPU can only perform as instructed. However, it will perform exactly as instructed, which may not always be what is intended. More on this later.

We need to pause a moment to define ROM, RAM, PEEK and POKE.

ROM and RAM are types of memory locations within your computer. ROM stands for

Read Only Memory, and RAM for Random Access Memory, neither of which explains their functions very well. All memory locations (addresses) can be thought of as storage boxes. Some of these boxes (ROM) cannot be altered while others (RAM) can be. This difference is all that we will be concerned with here, which brings us to PEEK and POKE.

PEEK allows us to look at the contents of these boxes, as if they had glass tops. POKE is the command that places a number in the boxes (RAM only). Try POKEing various numbers (no teddy bears or marbles), into a safe address (30,000 will do), then PEEKing the location to see if you attain the results you expected. Try other locations if you think there is something magical about 30,000. Safe locations on the T/S 1000 are 16509-32767 (16K), and on the T/S 2068 are 26710-65535. Try an address 0-16383 (ROM). PEEK it first, then POKE, then PEEK again. You cannot change the contents of ROM, but you are welcome to look inside as often as you wish. You can find the proper syntax for PEEK and POKE in your Sinclair users manual.

I mentioned that the instructions being stored in the CPU are numbers. We will also store our MC as numbers, since that is all the CPU understands. Your computer's operating system and the basic interpreter are written in MC for this reason. For example, the CPU does not understand the basic command "PRINT". Instead, there is a subroutine of MC instructions (stored as numbers) in the basic interpreter of your computer which tells the CPU what steps are necessary to execute your PRINT command.

To see what I mean, ENTER and RUN Listing No.1 on your computer. You are looking at the numbers (MC) stored in the first 20 bytes of ROM. Obviously, you thoroughly understand what they mean(?)...don't worry, I don't understand them either, but the CPU does and that's the point. Those unintelligible numbers mean something to the CPU, and shortly they will mean something to us.

Listing 1

```
10 For I = 0 to 19
20 Print I; Tab 6; Peek I
30 Next I
```


You should notice that all the numbers are between 0 and 255. This is very important. For now, we need only know that 0 to 255 represents the limit of numbers that can be stored in a single byte. The reason for this will be obvious later, when we discuss binary numbers. Try changing the values in line 10 to look at other locations.

A quick scan of the Sinclair manual indicates how the computer stores numbers that are greater than 255. It ties two adjacent bytes together by increasing one of them by a factor of 256 (2^8). Storing numbers this way means that we can now use the numbers 0 to 65535 (2^{16}). The number that we increase by the factor of 256, is referred to as the high byte, making the other the low byte. The oddity in this, is that the Z80's designers chose to store the low byte first. For example, let's assume bytes 1 and 2 hold our number. The number held by these two are:

`PEEK (Byte 1) + 256 * PEEK (Byte 2)`

You have probably seen this formula before, and may have wondered what was happening. Many of the system's variables are stored in this manner, as well as all addresses. Even addresses less than 255 require two bytes storage. More on this later, also.

One other point. All the numbers we have discussed thus far are in decimal (base 10) which is how most of us count. Scientists and philosophers have debated why we use decimal numbers since approximately 1134 BC (before computers), and the general consensus, despite lack of empirical proof, is that it has something to do with our having ten fingers. (This has nothing to do with MC. However, I thought you trivia buffs would want to know.)

In this series, I will represent all MC with hexadecimal (base 16) numbers. This is not an effort to confuse you. I prefer using hexadecimal (hex) numbers for several reasons:

1. All numbers 0 to 255 can be represented with two digits.
2. Larger numbers can then be represented with a multiple of two digits.
3. Cleaner/easier screen displays.
4. Less keystrokes to enter MC.
5. My MC loader program handles hex numbers only.
6. Many MC listings are presented in hex numbers.
7. Personal preference, after all I'm writing this.

The fact that your computer only recognizes decimal numbers is not a problem. The computer is very good at conversions of this nature, and I prefer to let it do them.

Now that we know what the hieroglyphics are called...what is hex? It is base 16 numbers. Just as we represent decimal numbers with the digits 0-9, we also represent the first ten digits of hex numbers with the digits 0-9. The next six digits are the letters A-F. Therefore, we count in hex:

0,1,2,3,4,5,6,7,8,9,A,B,C,D,E,F

Don't be alarmed if this confused you. I have provided a full conversion chart. Practice using this chart. You will eventually be able to add and subtract, even think in hex. You will see that the chart represents all decimal numbers 0 to 255, as 00 to FF hex. It is important to realize that hex numbers are always two digits (or some multiple of two) long, even though I show them as single digits above. That is only to avoid confusion over what the first sixteen digits are. Many hex numbers are obviously not decimal. However, when there could be confusion, you should show a "h" after the hex number (10h). There is no "d" required for decimal, as decimal is the default. Some operating systems use another character to represent hex (such as # or \$). However, we will use a "h".

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
2	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
3	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
4	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
5	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
6	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
7	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
8	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143
9	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
A	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175
B	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
C	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207
D	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
E	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239
F	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

To use the chart, follow down the left edge to get the first hex digit. Then go to the top row for the second digit. The chart can be used to convert hex to decimal, and vice-versa.

I will leave you with the hexadecimal loaders for the T/S 1000 and T/S 2068. Enter the appropriate one for your computer, and save it for use in subsequent lessons. This loader will serve you well, while we are hand-assembling our MC, due to our routines being short. You do not need a full assembler until you are involved writing much larger MC routines, or entire MC programs.

The listings are self explanatory. You are prompted for an address in decimal, then begin entering your code in hex. Enter a "s" to stop. Your code is reflected on the screen to aid error spotting. The T/S 2068 will automatically save your code and clear the loader from memory. Unfortunately, that cannot be easily accomplished on the T/S 1000. We will discuss this in greater detail next time.

Syd Wyncoop
2107 S.E. 155th St.
Portland, OR 97233
(503) 760-7786

Hex Loader TS1000

```
10 Print "Enter start address in decimal"
20 Input a
30 Cls
40 Print "Code begins at "; a
50 Print
60 Let a$ = ""
70 If a$ = "" then Input a$
80 If a$ = "s" then Stop
90 Poke a, 16 * Code a$ + Code a$(2) - 476
100 Print a$( to 2); " ";
110 Let a = a + 1
120 Let a$ = a$(3 to )
130 Goto 70
```

Hex Loader TS2068

```
10 Cls: Input "Enter start address in decimal"; a: Cl
ear a ~ 1: Input "Please put on the caps lock"; a$
20 Let a = Peek 23730 + Peek 23731 * 256 + 1: Print "C
ode begins at "; a: Let x = a
30 Let a$ = ""
40 If a$ = "" then Input a$
50 If a$ = "s" then Goto 70
60 Poke a, 16 * (Code a$(1) - 48 - (7 and a$(1) > "9"
)) + Code a$(2) - 48 - (7 and a$(2) > "9"): Print
a$( to 2); " "; Let a = a + 1: Let a$ = a$(3 to )
: Goto 40
70 Let y = a + 1 - x: Save "mc" Code x, y: Save "mc"
Code x, y: New
```

TASPRINT and AERCO Printer Interface by Floyd Chrysler

When I purchased my new STAR SG-10 dot matrix printer and the AERCO Centronics printer interface, the first task I had was to get all my software working with my new equipment.

Digging out all the back issues of the many magazines and newsletters I subscribe to, I soon had all the instructions and pokes required for most of the programs I wanted to convert. I knew there would come a day, when I could prove to my wife there was a valid reason to keep the house so cluttered!

Naturally, TASWORD TWO was one program I had to have working with the Aerco Interface, and sure enough, after a few pokes there was NLQ output flowing from the Star printer. What a difference from that old T/S 2040. Next on to TASPRINT. It was then that I realized I didn't have any articles or tips on getting TASPRINT to work with my printer interface.

I loaded up the TASPRINT customising program and followed the instructions, but nothing came out of the printer. In desperation, I printed out the customising program to see if I could find some hint as to what could be going on, and there it was! In line 6510 it said, "What is your interface software print address?". The normal program flow never called this line. Typing run 6510 and typing in 64461, which is the entry entry point for the version 2.1 print driver

I had...all was well. Of course I had a Basic error message when it got to the RETURN, but Tasprint had poked the address for me, and I now had a working version of Tasprint for the Aerco I/F.

Now would the same technique work for the version on side 2, which was meant to be merged with Tasword Two? Of course not! The customising program had no such line. It was now time to really do some hard looking. Out came HOT-Z (thank you Mr. Kingsley). I loaded in the customised code and started looking. After a lot of hacking, the IN and OUT routines were found. They were set up for the TASMAN I/F, and incompatible with the Aerco. The following pokes were devised to correct this:

poke 52588,201	poke 52687,79
poke 52688,0	poke 52689,0
poke 52618,219	poke 52611,127
poke 52612,203	poke 52613,183
poke 52614,32	poke 52615,258
poke 52616,121	poke 52617,0
poke 52618,0	poke 52619,211
poke 52620,127	poke 52621,201

I followed the rest of the instructions that came with Tasprint for merging with Tasword Two, and soon had a working version of TASWORD/TASPRINT for the AERCO I/F. I now have five additional type fonts (with inverse and boxing) to add to the STAR's great features.

Just in case you didn't save your back issues, here are the TASWORD/AERCO pokes:

poke 57999,127	poke 58001,183
poke 58000,127	poke 58014,219
poke 58015,127	

REMEMBER

by Warren Fricke

How well can you remember a 7-digit telephone number? Look at such a number, turn away and whistle a tune, and then try to recall the number.

This game program gives you such numbers to REMEMBER. The routine is also third in a series that compares the use of a joystick with the use of INKEY\$ to produce motion in the player's piece. Although this routine has been fabricated to allow either method used. A joystick might be preferred by most player's in this game because of it's vertical motion requirement.

If you agree, you may want to delete reference to INKEY\$ in lines 330 and 340. The program will run a little faster if the computer is relieved of having to do an unnecessary work in the GOTO loop between lines 320 and 400.

```

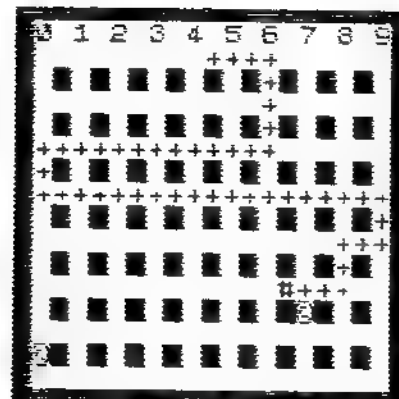
5 REM ** REMEMBER **
   ***
   Spectrum or T/S 2068
   by
   Warren Fricke

8 GO SUB 500
10 REM ENTER FRAME & SCALE
15 INPUT Z$: CLS
20 PRINT AT 2,5;"0 1 2 3 4 5 6
7 8 9"
25 POKE 23658,8
30 FOR n=2 TO 17
40 PRINT AT n,4;"█";AT n,24;"█"

50 NEXT n
60 FOR n=4 TO 24
70 PRINT AT 1,n;"█";AT 18,n;"█"

80 NEXT n
90 REM FILL FRAME
100 LET b$="": RANDOMIZE
110 FOR L=4 TO 16 STEP 2
120 DIM a$(19)
130 LET a=INT (19*RND+1)
140 IF a/2=INT (a/2) THEN GO TO 130
150 LET a$(a)="@ "
160 LET b$=b$+STR$ ((a-1)/2)
170 PRINT AT L,5; INK 4;a$
180 FOR c=6 TO 22 STEP 2
190 PRINT AT L,c; INK 1;"█"
200 NEXT c: NEXT L
210 PRINT AT 21,0;"The above contains your number."
220 REM USE THE 7 SYMBOLS
230 INPUT Z$
240 LET AA=22661
250 FOR n=0 TO 12 STEP 2
260 FOR m=0 TO 18 STEP 2
270 POKE (AA+m+32*n),36
280 NEXT m: NEXT n
285 PRINT AT 21,0;"The number is now hidden."
290 REM START THE GAME
300 INPUT Z$
310 LET L=3: LET C=14: LET s=0
315 POKE 23673,0: POKE 23672,0
320 LET LL=L: LET CC=C
330 LET C=C+(INKEY$="M")+ (STICK (1,1)=8) - (INKEY$="Z") - (STICK (1,1)=4)
340 LET L=L+(INKEY$="U")+ (STICK (1,1)=2)

```



YOU
RAN
OUT
OF
TIME

The number was 6609870
You remembered 5 digits.

```

350 IF POINT (8*C,8*(21-L))=1 THEN BEEP .1,-10: LET L=LL: LET C=CC. GO TO 330
360 IF POINT (8*C+2,8*(21-L))=1 THEN BEEP .05,20: LET s=s+1
370 PRINT AT L,C; INK 2,"#"
380 LET T=PEEK 23672+256*PEEK 23673
385 IF T>=30*60 THEN GO TO 405
390 PRINT AT LL,CC; INK 2;"+" A NO (LL<>L OR CC<>C)
395 IF L=17 THEN GO TO 410
400 GO TO 320
405 PRINT AT 8,25;"YOU";AT 9,25;"RAN";AT 10,25;"OUT";AT 11,27;"OF";AT 12,25;"TIME"
410 PRINT AT 20,0;"The number was ";b$
415 PRINT AT 21,0;" You remembered ";s;" digits."
420 PRINT #1,"Press ENTER "; FLASH 1;"TWICE"; FLASH 0;" to start a new game."
425 FOR n=1 TO 100: NEXT n
430 PAUSE 0. GO TO 15
500 REM END OF GAME
505 PRINT "You will get a random number 7 digits long. It will be made up of copyright symbols in the notches of the 7 BLUE lines. It reads from top to bottom."
510 PRINT "Your piece, #, starts at the top center. The object is to move it to the bottom, thru the correctly numbered notches, quickly, as you only get 30 sec."
515 PRINT "You move the piece left by the Z-key, right by the M-key, and down by the U-key, or use a JOY STICK in the left port."
525 PRINT "When you start, the number marks become hidden. You must "; FLASH 1;" REMEMBER "; FLASH 0;" them."
530 PRINT "Press ENTER for each, next step."
540 RETURN

```


How to Convert a Surplus WC2050 Modem into an RS-232 SERIAL INTERFACE for your TS1000/1500/2068

INTRODUCTION

The purpose of this article is to show you how, with the addition of a few inexpensive components, you can convert a WC2050 modem board into a general purpose RS232 serial interface.

In October of last year, Anchor Automation auctioned off several thousand completely assembled WC2050 Modem boards as electronic surplus. Fortunately for Timex users, these boards were discovered by Timex support companies like Zebra Systems Clifford Associates, Sunset Electronics, and RMG and are being resold to Timex users at bargain basement prices.

BLOCK DIAGRAM

Now take a look at Figure 2. It shows a block diagram of the modem board. The address decoding, crystal oscillator, frequency divider and 8251 serial I/O, and power supply portions provide nearly all we need for an RS232 interface. As a complete modem, the input and output serial data available at the points marked A and B, would be connected to the modem's analog circuitry and translated between tone frequencies and voltage levels. For an RS-232 interface we need to redirect these signals to DC voltage level translators.

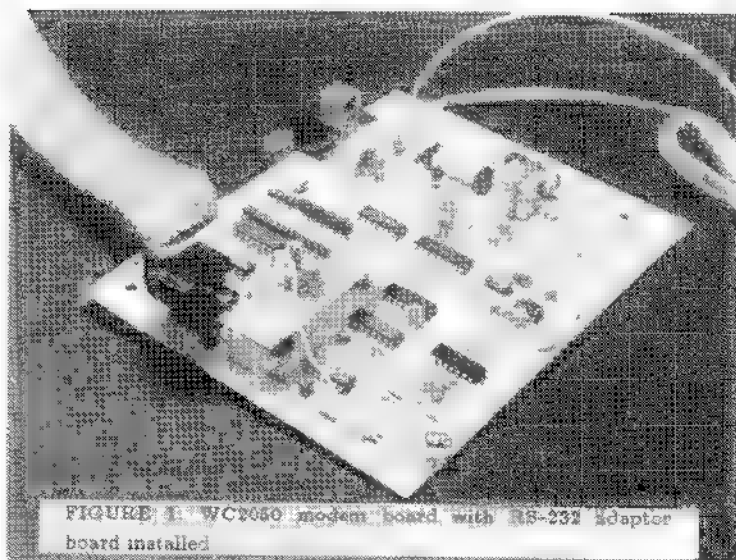
RS-232 PARTS

Next take a look at Figure 3. It shows a schematic of the recommended RS-232 adaptor circuit. The parts list is contained in Figure 4. Notice that there are only three IC's. A MC1889 Line Receiver is used to buffer the incoming signals; a MC1888 Line Driver is used to buffer the outgoing signals; and an Intersil ICL7662 switching regulator is used to develop the required negative supply voltage from the modem's +9 Volt supply. An alternative to using the switching regulator would be to just use a second 9 VDC A/C adaptor. In our prototype we used a 9-Pin Male Atari Joystick style connector for our RS232 output, but you can directly wire in a cable or another choice of connector.

INSTALLATION PROCEDURE

Before installing the RS 232 adaptor board, be sure you have a working modem board in front of you. It is not important that the modem's analog section be working as long as the digital portion of the board is working. Of course if the entire modem does work, the digital portion will work.

Build up the circuit shown in figure 3. The parts are easy to find except for the Intersil regulator (see below). An optional etched and drilled PC board is available to simplify building



the circuit, but any small protocard such as the ones available from radio shack will do fine.

CONSTRUCTION HINTS

The RS-232 adaptor board requires 9 signals from the modem board:

OUTPUT SIGNALS: RTS, TX, DTR

INPUT SIGNALS: RX, CTS, DSR

POWER SIGNALS: GROUND, +5 Volts, +9 Volts

Eight of these signals are available at the pins of the 8251 serial I/O chip. The only signal not present on the chip is the +9 volt power, which can be picked up on one side of the modem's DATA Light Emitting Diode (LED). Our prototype board (shown in Figure 1), takes advantage of this and uses a pin-and-socket arrangement to make the 8 connections at the IC. First a 28-pin IC socket is soldered right on top of the 8251. Then pins are soldered onto the RS-232 PC Board so that the board can plug in, right on top of the IC. The ninth signal required is made by attaching a single wire between the RS-232 board and the +9 Volt power where the LED is. The positive side of this LED is the lead closest to the corner of the modem board.

TRACE CUTS

You must make three trace cuts on the modem PC board. This is to disconnect the three modem input-signals that go from the modem's analog section to the 8251 chip. These signals are replaced with those coming from your RS-232 adaptor board. The traces to cut are shown in Figure 5.

SOFTWARE & TESTING

If you just want to test out your RS-232 by itself you can do a simple wrap around test by temporarily connecting CTS to RTS, and TX to RX. A sample TS2068 software driver for the modem is shown in figure 6. Under this test arrangement, whatever you send out will be wrapped around and received back.

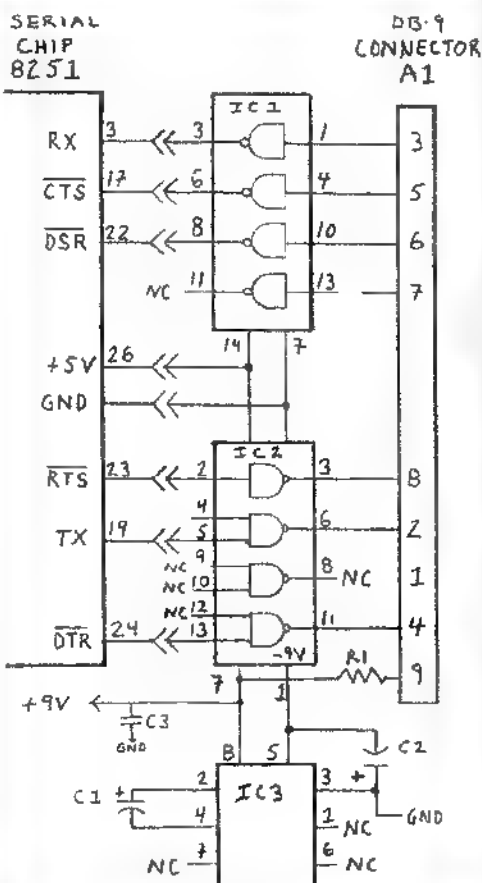


FIGURE 3. RS-232 ADAPTOR SCHEMATIC

FIGURE 4. MC2050-TQ-RS232 PARTS LIST

IC1	MC1489 QUAD LINE RECEIVER
IC2	MC1488 QUAD LINE DRIVER
J1,J2	WIRE JUMPERS, 0.3 INCH
J3	WIRE JUMPER, 4.5 INCH
A1	CONNECTOR, DB-9 MALE "JOYSTICK TYPE"
A2	DUAL ROW WIRE-WRAP HEADER PINS
R1	RESISTOR, 1K 1/4W
PC89-C	PRINTED CIRCUIT BOARD
C3	0.1UF 25V CER. DISC. (SUPPLY BYPASS)
----- POWER SECTION - VERSION ONE -----	
IC3	INTERSIL ICL7662 POWER CONVERTER IC
C1	10UF 16V ALUM. ELECTROLYTIC (CHARGE PUMP)
C2	10UF 16V ALUM. ELECTROLYTIC (OUTPUT)
----- POWER SECTION - VERSION TWO -----	
A3	2.5MM OR 3.5MM JACK (NEGATIVE POWER)
X1	AC POWER ADAPTOR

The following items are available from Zebra Systems:

- RS-232 Adaptor Etched & drilled PC board with project instructions, price \$5.95.
 - Intersil ICL7662 Power Converter IC & Specs., \$5.00
 - Complete kit for adaptor including PC Board, all 3 IC's, Capacitors, Connectors and instruction, \$19.95
- Add \$3.00 for Postage & Handling, quantity discounts are available.

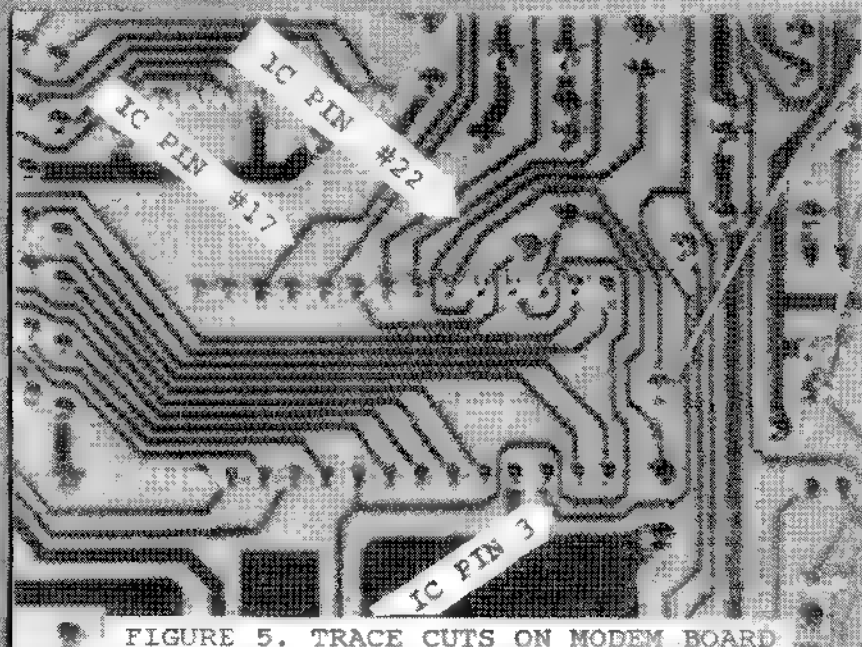


FIGURE 5. TRACE CUTS ON MODEM BOARD

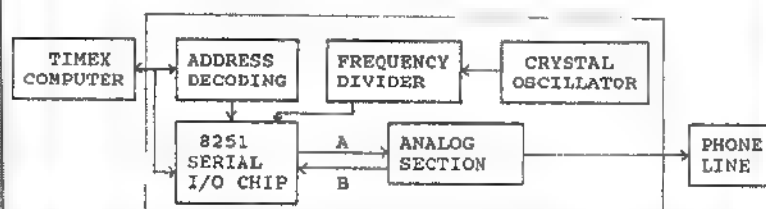


FIGURE 2. MODEM BLOCK DIAGRAM

FIGURE 6. Sample TS2068 BASIC driver

for wrap-around test at 1200 BAUD.

Change 78 in line 14 to 79 for 300 baud.

```

10 OUT 119,0. REM send Zero to
    clear UART chip
11 OUT 119,0
12 OUT 119,0
13 OUT 119,64 REM UART reset
14 OUT 119,78 REM 1200b, 8 bit
    NO parity
15 OUT 119,55 REM Enable Xmit
    and Receive
20 REM Each byte sent OUT 115
    will arrive on the Transmit
    line of the RS-232 port.
25 REM Example
30 PRINT "This is a test."
40 LPRINT "This is a test."
50 LET a$="This is a test." G
O SUB 1000
60 PRINT "End of TEST."
70 LPRINT "End of TEST."
80 LET a$="End of TEST." GO 3
UB 1000
90 STOP
1000 LET i=LEN a$ IF i=0 THEN G
O TO 1050
1010 FOR x=1 TO i
1020 OUT 115 CODE a$(x) PAUSE 4
1030 PRINT CHR$ IN 115.
1040 NEXT x
1050 RETURN

```

HOW TO CONNECT WITH (AND USE) A BBS

by Ed Grey, SYSOP of
The "Original" Time[X]Change

One of the questions most frequently asked of me is: "How do I log onto your BBS?" This article is (hopefully) a simple primer on that subject. First a definition. BBS (Bulletin Board System): a computer programmed to receive, save and display messages to and from its users. The BBS is usually accessible from remote computers via telephone lines. The hardware required for this "tele-communication" is a computer (T/S 2068, 1000/1500), a modem (Westridge TS 2050, Byte-Back), and the proper software (Mterm II, Smart I, Z-Comm) for the computer/modem combination that you are using.

Once the hardware is connected and the software is loaded (check your manuals for instructions) you are ready to begin. There are several "parameters" that you should be aware of, to help you connect with a BBS. They are "word length" (usually 7 or 8), "stop bits" (1 or 2), "parity" (odd, even or none) and "duplex" (half or full). Your software parameters must be the same as those of the host computer or you may not be able to exchange data. The two most common configurations are 7/1/even and 8/1/none for word length/stop bits/parity, respectively. The duplex controls your screen display (more on that later).

You are now ready to call a BBS. Note: My unbiased recommendation of a "friendly" BBS to call is YOUR AVERAGE REMOTE BBS (213) 325-0213. I just happen to be "SysOp" (System Operator) of a Timex/Sinclair sub-board (1 of 2 or more message bases on a BBS) called THE "ORIGINAL" TIME[X] CHANGE on this BBS. Parameters: 8/1/none. If you know the parameters of the BBS you are about to call, set your software now. There may be a menu to use for this (check your software manual). Dial the BBS number. The BBS, if not busy and online, will answer with a high-pitched tone. The TS 2050, with Mterm II or Smart I s/w will "connect" automatically. Other modems and/or software may require you to connect manually. Either way, once connected you are accessing another computer remotely.

Now the fun begins. The host computer may need prompting to begin sending. One to 4 [CR]'s (ENTER) are usually enough to get the system started. Your Average Remote BBS will ask you, "How Many Nulls Do You Need (0-9)?" Answer 0, then [CR]. (Nulls are for printers, always 0 for CRT.) Next the Average will ask you, "Can your terminal display lowercase?". Answer "y" or "n" depending on your computer. (A word about "duplex" is now in order. If your terminal displays double characters when you type, then toggle your duplex setting. Likewise if your terminal doesn't display anything when you type, toggle your duplex. If it looks okay, it is okay.) Now the BBS will tell you its name, phone number, parameters and other pertinent information.

You are now ready to "log on" the BBS. My personal preference is that only real names be used, but there are many BBS's that allow and encourage "handles" (aliases). In any case, the next prompt is, Enter First Name. Type it in followed by a [CR]. Then enter last name at prompt, [CR]. The system will re-print what you have entered and ask, "Is that correct?". Answer "y" or "n" accordingly. After checking its memory, the system will ask, "Are you a new user?", if indeed you have not called before. New users are asked to answer a few questions...these vary at the discretion of the Sysop. These questions help a Sysop separate BBS users from system abusers, and the answers



may determine who is "validated". (On a closed BBS, validation is required before access is possible. YARBBS is an open system.) "Enter a password", types the computer. A password is a series of letters, numbers and special characters known only to you. This password will be used by the system to identify who you are, so that no one else can access the system by using your name or read your "private" messages. There are 3 criteria for a good password. It should be unique, difficult to guess, and memorable. Keeping that in mind, now enter a password. Remember your PW because you will need to use it the next time that you call this BBS. The system will check to see if anyone else is using the same PW. If not, the password will be yours, and you have completed the "log on" procedures.

If the BBS that you have chosen to call is a closed system, one of several things may happen. You may have only limited access, you may have only a limited time online, or you may have to log off now and wait (usually 24-48 hours) for validation before you can use the system. If the BBS is open, then you can examine and fully utilize the system now. After the possible scrolling of some bulletins, the system should stop at the "main menu". Save yourself some time and make a printout of this menu if you can. This menu is the heart of most BBS's. It is from this point that most functions begin. In time, you will remember the cues, but in the beginning this hardcopy will be most useful. There may be several sub-menus also. You may or may not want copies of these. Usually a "?" at the command prompt will cause the BBS to display the full menu (with explanations).

It is at this point that the differences between BBS's come into play. There are many BBS programs that run on many different computer types. On most (not all), if you enter "R" at the main menu, you can read the messages. An "S" usually scans the message headers. An "E, L, or P" may let you write a message. On the Average BBS, enter a "W" to change sub-boards. Some BBS's have an area where it saves information about your computer set up. Setting these "defaults" correctly can make using the BBS easier in the future. On the Average you enter "M" to set defaults. The best advice at this point is to feel your way around the BBS. Most Sysops are very understanding of "new users" and will attempt to assist you if they have time. Don't hesitate to leave open messages on the boards requesting help. Most modems are eager to help. We were all "new users" once. Above all, participate on the BBS. Don't be a LOOKY LOC...leave a message, say "Hi!".

There are all kinds of BBS's around. Some are mainly message boards, others specialize in exchanging free public domain programs. On some you can find a mate, and on others you find out how to better operate your computer. On most, the only charges are for the phone call (beware...phone charges can add up). Try out your modem on a local BBS, or contact me on the Average BBS. I would be very glad to hear from you online. Did you say that you "Don't have a modem?". Just send a SASE to: Ed Grey, P.O. Box #2186, Inglewood, CA 90305. I will send you info on a modem deal you can't refuse. Take care and I'll see you on the boards (bulletin boards, that is).



Low Cost High Tech 2068 Burglar Alarm

by Joe Newman

Many T/S 2068 owners have a desire to protect not only their 2068, but other valuables as well. But with the cost of "good" alarm systems costing hundreds or even thousands of dollars, most people would rather take the chance that they never will be ripped off rather than buy an alarm. It was hard enough convincing the spouse to let you spring for a 2068...and you know that you would never be able to convince your spouse to let you get an expensive alarm.

Well now you can kill two birds with one stone (as they say). You can justify your 2068 purchase as being practical, and you can also have a great alarm system...the alarm with high tech features and a LOW price! All that and it is easy to set up too! Here's how:

The heart of the alarm is the interface with the computer. All it is, is a jack plugged into either joystick port...or both if you want. Follow these steps to make it (Fig. 1). Also, please refer to the parts list for reference of the different parts that will be discussed.

- 1) Cut one end off the joystick cable.
- 2) Strip all wires except the brown, white, and black wires (these aren't used).
- 3) Connect each wire to a screw on one side of a barrier strip.
- 4) Connect all screws on one side of the unused barrier strip with the jumper, then attach a wire between the unused screw in front of the GREY wire to any screw of the second barrier- on the same side that the eight-position jumper is attached. This wire is a common wire used for final connections.

The interface is now finished! I told you it was easy. Now comes the harder part.

You have a choice here. If you want the alarm to be able to tell you where a break-in has occurred, you will have to run double wires to every detector in the house. The simple hook-up is to just make an open circuit alarm circuit (see Fig. 2). Then you have one wire coming off the barrier strip, connecting between every detector, and a wire coming back to the computer completing the circuit. You probably would want to do it this way, as you might not care to know exactly where a break-in is occurring...you'll be ready with your UZI.

To wire up the closed loop circuit, follow these easy steps. For detectors, I would choose items for normally CLOSED circuit alarms...if a wire is cut, it will sound the alarm. With normally open circuit alarms, a thief can cut a wire to disable the alarm. (Note: closed circuit magnetic switches are also cheaper than open circuit ones.) With this 2068 alarm, if power to the 2068 is cut, NO alarm will sound. However, it is highly unlikely for a burglar to cut power to a house...why should he bother? If he knows there is an alarm, he would usually stay away for fear of setting off the alarm...and he would know that most alarms these days have battery backup anyways, so cutting power wouldn't help. Now on to the loop.

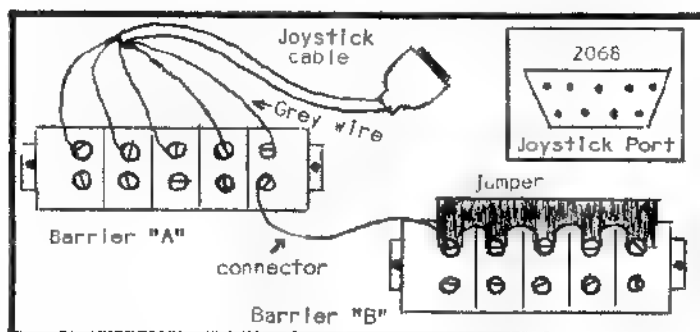


Fig. 1

1) Determine where you want to mount detectors (magnetic switches, window foil, vibration detectors, window sensors, ect.). Hook them up to the door or window as directed on the package. This usually involves screwing in two screws and/or pressing tape in place. Not hard stuff.

2) Using 20 or 22 gauge stranded wire (or whatever you you prefer, single conductor, ect.), run a wire from a screw on the common barrier (connected to the GREY wire), to one terminal of whichever detector is closest to the computer (see Fig. 2, part A).

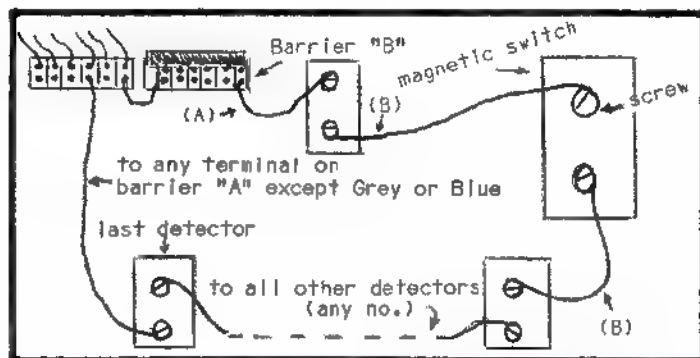


Fig. 2

3) Now run a wire from the second terminal of the detector to a terminal on the next nearest detector. Continue stringing detectors together as in Fig. 2, part B.

4) Now that all the detectors are connected, run a wire from the open terminal on the last detector to the screw on the barrier in front of the GREEN wire.

Now to test out the loop, plug the joystick jack on the left or right side of the computer, whichever is easier and enter the following program lines:

```
10 PRINT STICK (1,1) ...this line is for the left jack.
20 GOTO 10
If the right jack is used, replace line 10 with...
10 PRINT STICK (1,2)
```

RUN the program. If ones are printed on the screen, the loop is working! Congratulations! If zeros are printed, the loop has a break in it somewhere...go back and check. If you find no break, you may have to try the program six times, each time connecting the returning wire to a different screw on the barrier of wires. All joystick cables that I bought had the same color coding, it is possible that Radio Shack could have pulled a "switch" on you.

Now all you have to do is enter the following program as your alarm's "brain". This is a very simple program...no bull has been added. If you want to add color, print statements, ect., go ahead!

```

10 REM ***ALARM SENSOR PROGRAM
20 INPUT "Hit (ENTER) to activate alarm"; a$
30 PRINT "You have 30 seconds to leave."
40 PAUSE 1800
50 IF STICK (1,1)=1 THEN GOTO 50
60 PAUSE 1800: REM 30 sec. entrance time
70 FOR X=1 TO 5
80 FOR Y=1 TO 300
90 BEEP .1,20: BEEP .1,30
100 NEXT Y: NEXT X
110 GOTO 50: REM resets alarm after 5 min.

```

If you are using the right hand joystick port, substitute line 50 with the following line...

```
50 IF STICK (1,2)=1 THEN GOTO 50
```

That's all there is to it! You can have an output to an amplifier from the MIC jack of the computer...or to a stereo system. When the alarm sounds...WOW! With the right volume it should be enough to scare the hair off a gorilla! You can create an extremely powerful and annoying sound with the BEEP loop and an external amp. Experiment for your own favorite sound.

Now for the hardest part of all. IF YOU HAVE SETTLED ON THE SIMPLE CLOSED CIRCUIT ALARM ABOVE, YOU DON'T HAVE TO READ FURTHER. I will now explain how to make the sophisticated system which will allow you to tell exactly where a trouble spot is. You will have to run a wire from the computer to every detector.

1) Follow step one above for detector hook-up.

2) Now you will have to run a wire from each terminal on barrier A, to one terminal on each detector (see Fig. 3). USE OPEN CIRCUIT DETECTORS ONLY-FOR SIMPLIFICATION OF THIS VERSION OF THE CIRCUIT.

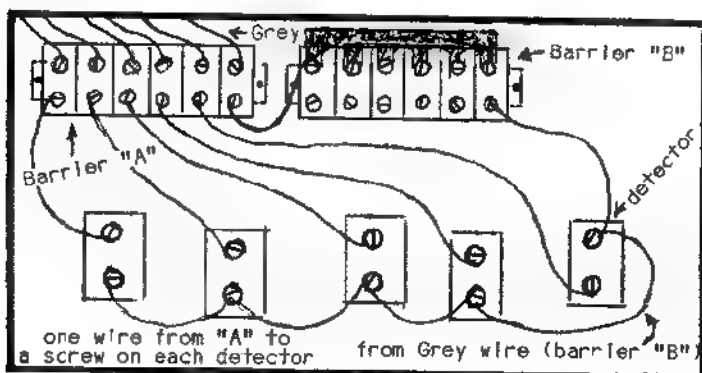


Fig. 3

3) You can now either run a wire from each terminal of barrier B (GREY wire) to the unused screw of each detector, OR run a wire from each screw of the barrier B to the unused terminal of the closest detector. Then connect to this wire another wire running to the unused screw on the next closest detector. Keep stringing the unused screws of each detector together in this manner until you are finished (see Fig. 4).

4) Now to test all the loops, plug the jack into either side of the computer, then enter and RUN the following test program:

```

10 PRINT STICK (1,1)      ...for left side joystick port
20 GOTO 10

```

Use this alternate line 10 for right joystick port.

```

10 PRINT STICK (1,2)

```

Only zeros should be printed on the screen. If any numbers are printed, check the connections, AND MAKE SURE THE WINDOWS AND DOORS THAT THE DETECTORS ARE ATTACHED TO ARE CLOSED:

Now check to see which color wire is connected to which detector. If the red wire runs to a detector in the living room, write this down, ect. You will have to assign variables in the program according to where each wire runs. In the program, assign the variables in line 20, according to this: a\$=red wire, b\$=green, c\$=yellow, d\$=orange, e\$=blue wire. The blue wire is the wire which normally goes to the joystick button, and the computer uses STICK (2,1) to detect if the button is pushed...button is device #2 (see 2068 users manual, page 174). Now the program:

```

10 REM *** Sophisticated Sensor Program
20 LET a$="den": LET b$="kitchen"

```

Note: see instructions above for line 20. Enter the variables according to what you wrote down (above).

```
30 INPUT "Press (ENTER) to activate alarm"; z$
```

```
35 PAUSE 1800: REM 30 sec. exit delay
```

```
40 IF STICK (1,1)<>0 THEN GOTO 100
```

Note: use STICK (1,2) for joystick port on right side.

```
50 IF STICK (2,1)=0 THEN GOTO 40
```

Note: use STICK (2,2) for joystick port on right side.

```
100 PAUSE 1800: REM 30 sec. entry delay
```

```
110 LET break=STICK (1,1): IF STICK (2,1)=1 THEN GOTO 500
```

Note: for right joystick port use STICK (1,2) and STICK (2,2) respectively.

```
120 IF break=8 THEN LET w$=a$
```

```
130 IF break=2 THEN LET w$=c$
```

```
140 IF break=1 THEN LET w$=b$
```

```
150 IF break=4 THEN LET w$=d$
```

```
160 PRINT "BREAK IN AT ";w$
```

```
170 FOR x=1 TO 5: FOR y=1 TO 300
```

```
180 BEEP .1,20: BEEP .1,30
```

```
530 NEXT y: NEXT x
```

```
540 GOTO 40: REM alarm reset after 5 min.
```

SAVE the programs. LOAD them whenever you want to run the alarm. You can change the PAUSE values to vary the enter/exit delay. To turn the alarm off after you enter, either hit break or turn the machine off.

It is assumed that you would usually have the screen off or in a room where you will be able to see it while the alarm is active. The best place to have the computer is within about twenty seconds of the entrance, so if you know that the alarm is active, you have time to turn it off. An unsuspecting burglar would be unsure of his surroundings and would linger long enough to set off the alarm. If you have the computer hooked up to an amplifier, he will NOT stick around to see what kind of alarm it is!

If you need to hook up more than 5 detectors, make another interface for the other jack on the computer. Wire it up just like the first one, but add this line to the programs...if simple circuit is used:

```
50 IF STICK (1,1)<>1 THEN GOTO 60
```

```
55 IF STICK (1,2)<>1 THEN GOTO 60
```

```
57 GOTO 50
```

Note: use<>1 if closed circuit detectors are used,<>0 if open circuit ones are used, in lines 50 and 55.

This will allow another set of 5 detectors to be hooked up...if more are needed, contact me (address at end of article), as it is possible.

If the second alarm program and circuit is used, add this line to the program:

```
25 LET f$="bedroom 1": LET g$="bedroom 2"
```

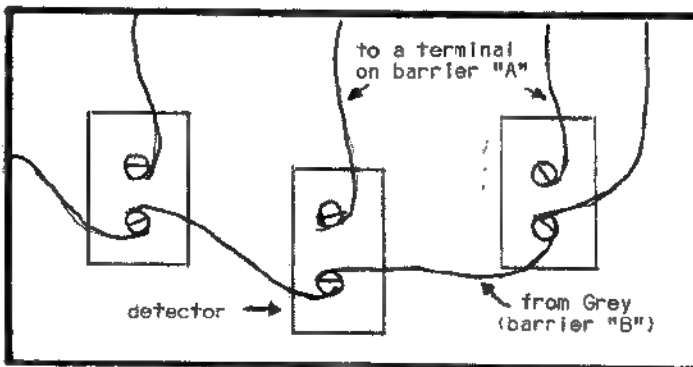


Fig. 4

Note: define another six variables the same way you did for line 20, going around writing down which wire goes to which detector.

```
40 IF STICK (1,1)<>0 THEN GOTO 100
```

```
45 IF STICK (1,2)<>0 THEN GOTO 100
```

```
50 IF STICK (2,1)<>0 THEN GOTO 100
```

```
55 IF STICK (2,2)=0 THEN GOTO 40
```

```
110 LET break=STICK (1,1): LET break2=STICK (1,2): IF STICK (2,1)=1 THEN GOTO 500
```

```
115 IF STICK (2,2)=1 THEN GOTO 500
```

```

151 IF break2=8 THEN LET w$=f$
152 IF break2=2 THEN LET w$=h$
153 IF BREAK2=1 THEN LET w$=g$
154 IF break2=4 THEN LET w$=i$
    Note: blue wire on new jack=j$ remember.
500 IF STICK (2,1)=1 THEN LET w$=e$: GOTO 505
502 LET w$=j$
505 PRINT "Break in at ";w$

```

SAVE the program, and run to test. Make sure all doors and window detectors are attached to, are closed. You can pretend a break-in is occurring by tripping a detector. See if the program is accurate. If a detector in the living room is tripped, the program should say "Break in at living room". If it says something else, you may have made a mistake in assigning the variables.

FURTHER TIPS: It is easy to hook up the wires around the house...use a staple gun. Then you can paint over wire and staples to camouflage them. You can use a continuity tester (Radio Shack, \$1.95) to test closed circuit loops for breaks. If the loop is complete, the tester beeps. This device can come in handy for isolating trouble spots. No, I don't own Radio Shack... it just seems that everyone lives near and RS store, so to make things as easy as possible, I have recommended use of all Radio Shack parts. This minimizes the trouble in finding the right part...you don't have to search all over the country for some strange "wigizmo".

PARTS LIST

Joystick extension cord RS #276-1978
 2 Dual row barrier strips #274-659
 eight position jumper #274-650
 magnetic door/window switches- closed circuit, #49-495, open circuit #49-512
 see article for more info
 glass breakage detector # 49 516
 window foil items, #49-502,504,518
 wire-22 gauge stranded #278-1296 (90 feet)

It may be possible to add a BYTE-BACK BBI Control Module to your 2068, and then when the alarm is tripped, the module can be used to control an external alarm bell, lights, auto-dialers, ect. To minimize cost and trouble, I have not included this device or any like it in my plans for the alarm. You can add whatever you want though. I am interested in hearing how others may utilize this program and idea of using the joystick jack for uses besides joysticks. Please feel free to drop me a line with your comments, questions, ect. to: Joe Newman, 175 Osborn Ave., New Haven, CT 06511.

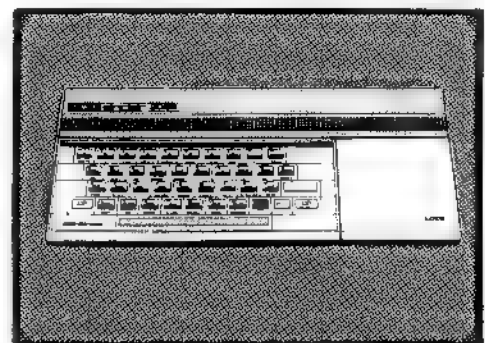
HI-RES/64 COL. GRAPHICS UTILITY

by S.D. Lemke

This program is a graphics utility that I wrote to convert a standard 32 col. screen to a high resolution (64 col.) screen. The user has the option of placing the 32 col. screen (which is on the left half of the new 64 col. screen) on the right half of the screen, or starting on a user-defined column. You can also double the image to get left and right pictures simultaneously, or you can combine two standard 32 col. pictures to get one hi-res, 64 col. picture.

The program is very easy to use. A few comments however: The program is mostly BASIC. Lines 9100 to 9140 POKE into memory, five short machine code routines to set up the advanced video modes, calculate addresses of pixel locations, clear Display File 2, copy a temporary Display File 3 into Display File 2, and clear Display File 3 respectively. Each of these lines has a "self check", to insure that the correct values have been used. An error in any line will produce a warning, and the line with the error will be identified.

When the program runs, you will be given a choice of five options. Press 1-5 to select an option. 1) Is a Double Image effect, designated as 32 => 32 + 32 in the listing. 2) Places the new picture on the left 32 columns of the new 64 col. screen. 3) Places the new picture on the right 32 columns of the new 64 col. screen. 4) Is user SPECIFIC. You will be prompted to "Specify Beginning Column". The new picture will be placed starting at the specified column of the new screen. 5) Is a merge function designated 32 + 32 => 64. You will load two standard 32 col. screens. The first will go on the left half of the new 64 col. screen, the second will go on the right half of the screen. When each function is completed, you will be prompted to "Prepare Tape...". You can save the new 64 col. screen to tape for future use. Note: This is a two-part save. First, Display File 1 is saved, then Display File 2 is saved. The screen will go into the standard 32 col. mode while the saves are being made. The effect will probably surprise you, but don't worry. What happens is that in the 64 col. mode, every odd column is from Display File 1, while the even columns are from Display File 2. When you go from 64 col. to 32 col., you drop out all the even columns and look at only half of the picture. When Display File 2 is completely saved, the 64 col. screen will return and the program will "stop".



1 REM *****

P3/GE APPEND

© by S D Lemke

Lemke Software Development
 2144 White Oak
 Wichita, Ks 67207

```

100 REM 57000 -- video mode
110 REM 57040 -- locate
120 REM 57075 -- clear DF 2
130 REM 57090 -- DF3 -> DF1
140 REM 57105 -- clear DF 3

```

```

300 GO SUB 9100: RANDOMIZE USR
57000: OUT 255,0: PAPER 1: BORD
ER 1: INK 7: CLS : RANDOMIZE US
R 57075: RANDOMIZE USR 57105
400 CLS
500 PRINT AT 0,0:
" P3/GE APPEND

```

Use this program to convert a standard 32 column screen to a 64 (hi res) column screen.

Press 1-5 to select an option.

```

510 PRINT : PRINT : PRINT "
1) DOUBLE IMAGE (32 => 32 + 32)
2) LEFT ONLY
3) RIGHT ONLY
4) USER SPECIFIC
5) LEFT + RIGHT (32 + 32 => 64)
"

```

```

520 PAUSE 0: LET a$= INKEY$: I
F a$<"1" OR a$>"5" THEN BEEP 1,
0: GO TO 520

```

```

530 PRINT AT B+ VAL a$,1; OVER
1; FLASH 1; " : IF a$ <> "4" TH
EN GO TO 600
540 INPUT "Specify Beginning Co
lumn ";b$: LET lb= LEN b$: IF lb
=0 THEN BEEP 1,0: GO TO 540
550 FOR i=1 TO lb: IF b$(i)<"0"
OR b$(i)>"9" THEN BEEP 1,0: GO
TO 540
560 NEXT i
570 LET b= VAL b$: IF b>32 THEN
BEEP 1,0: GO TO 540
580 LET b= INT (b/2)
600 PRINT AT 14,10;"LOAD SCREE
N": LOAD "" SCREEN$
700 GO SUB (10000 VAL a$)
800 PRINT @0; AT 0,0;"Prepare t
ape to SAVE your new 64Column SC
REEN. Note: 2 part SAVE": FAUSE
120: PRINT @0; AT 0,0; TAB 31;"
"; TAB 31;" " : PRINT @0; AT 0,0;
" Press any KEY to CONTINUE":
FAUSE 0; OUT 255,0; SAVE "FSGE A
PEND" SCREEN$ : SAVE "PSGE AFEND
" CODE 24576,6912
900 OUT 255,54: STOP
1000 REM 32 -> 32 + 32
1010 FOR y=175 TO 0 STEP -1: LET
x=0: POKE 65414,x: POKE 65415,0
: POKE 65416,y: POKE 65417,0: RA
NDOMIZE USR 57040: LET p=256: F
EEK 65399+ FEEK 65398: LET q=p+8
192: LET r=p+33536: LET s=256: F
EEK 65375+ FEEK 65374
1020 LET v= FEEK p: POKE p,255:
POKE s,15: POKE r,v: POKE r+16,v
: LET p=p+1: LET s=s+1: LET v= F
EEK p: POKE p,255: POKE s,15: PO
KE q,v: POKE q+16,v: IF x<238 TH
EN LET x=x+16: LET p=p+1: LET s
=s+1: LET r=r+1: LET q=q+1: GO T
O 1020
1030 NEXT y
1040 OUT 255,54: RANDOMIZE USR
57090
1050 RETURN
2000 REM 32 -> 32 + 00
2010 FOR y=175 TO 0 STEP -1: LET
x=0: POKE 65414,x: POKE 65415,0

```

```

: POKE 65416,y: POKE 65417,0: RA
NDOMIZE USR 57040: LET p=256: F
EEK 65399+ FEEK 65398: LET q=p+8
192: LET r=p+33536: LET s=256: F
EEK 65375+ FEEK 65374
2020 LET v= FEEK p: POKE p,255:
POKE s,15: POKE r,v: LET p=p+1:
LET s=s+1: LET v= FEEK p: POKE p
,255: POKE s,15: POKE q,v: IF x<
238 THEN LET x=x+16: LET p=p+1:
LET s=s+1: LET r=r+1: LET q=q+1
: GO TO 2020
2030 NEXT y
2040 OUT 255,54: RANDOMIZE USR
57090
2050 RETURN
3000 REM 32 -> 00 + 32
3010 FOR y=175 TO 0 STEP -1: LET
x=0: POKE 65414,x: POKE 65415,0
: POKE 65416,y: POKE 65417,0: RA
NDOMIZE USR 57040: LET p=256: F
EEK 65399+ FEEK 65398: LET q=p+8
192: LET r=p+33536: LET s=256: F
EEK 65375+ FEEK 65374
3020 LET v= FEEK p: POKE p,255:
POKE s,15: POKE r+16,v: LET p=p+
1: LET s=s+1: LET v= FEEK p: POKE
p,255: POKE s,15: POKE q+16,v:
IF x<238 THEN LET x=x+16: LET
p=p+1: LET s=s+1: LET r=r+1: LET
q=q+1: GO TO 3020
3030 NEXT y
3040 OUT 255,54: RANDOMIZE USR
57090
3050 RETURN
4000 REM 32 -> SPECIFIC
4010 FOR y=175 TO 0 STEP -1: LET
x=0: POKE 65414,x: POKE 65415,0
: POKE 65416,y: POKE 65417,0: RA
NDOMIZE USR 57040: LET p=256: F
EEK 65399+ FEEK 65398: LET q=p+8
192: LET r=p+33536: LET s=256: F
EEK 65375+ FEEK 65374
4020 LET v= FEEK p: POKE p,255:
POKE s,15: POKE r+b,v: LET p=p+1
: LET s=s+1: LET v= FEEK p: POKE
p,255: POKE s,15: POKE q+b,v: I
F x<238 THEN LET x=x+16: LET p=
p+1: LET s=s+1: LET r=r+1: LET q
=q+1: GO TO 4020

```

```

4030 NEXT y
4040 OUT 255,54: RANDOMIZE USR
57090
4050 RETURN
5000 REM 32 + 32 => 64
5010 GO SUB 2000: FAUSE 60: OUT
255,0: CLS : PRINT AT 14,10;"LO
AD SCREEN 2": LOAD "" SCREEN$ :
GO SUB 3000: RETURN
8999 STOP
9000 DATA 46,0,62,1,211,244,219,
255,203,255,211,255,62,6,245,251
,205,142,14,0,219,255,203,191,21
1,255,175,211,244,241,254,128,32
,4,50,91,104,251,201
9010 DATA 33,134,255,78,33,136,2
55,70,205,3,38,34,116,255,124,19
8,32,103,34,96,255,124,15,15,15,
230,3,244,88,103,34,94,255,201
9020 DATA 17,0,96,33,0,64,1,0,27
,237,176,201
9030 DATA 17,0,64,33,0,195,1,0,2
7,237,176,201
9040 DATA 17,0,195,33,0,64,1,0,2
7,237,176,201
9100 LET sum=0: RESTORE 9000: FO
R i=57000 TO 57038: READ a: POKE
i,a: LET sum=sum+a: NEXT i: IF
sum <> 6207 THEN LET i=9000: GO
TO 9800
9110 LET sum=0: RESTORE 9010: FO
R i=57040 TO 57073: READ a: POKE
i,a: LET sum=sum+a: NEXT i: IF
sum <> 3912 THEN LET i=9010: GO
TO 9800
9120 LET sum=0: RESTORE 9020: FO
R i=57075 TO 57086: READ a: POKE
i,a: LET sum=sum+a: NEXT i: IF
sum <> 852 THEN LET i=9020: GO
TO 9800
9130 LET sum=0: RESTORE 9030: FO
R i=57090 TO 57101: READ a: POKE
i,a: LET sum=sum+a: NEXT i: IF
sum <> 951 THEN LET i=9030: GO
TO 9800
9140 LET sum=0: RESTORE 9040: FO
R i=57105 TO 57116: READ a: POKE
i,a: LET sum=sum+a: NEXT i: IF
sum <> 951 THEN LET i=9040: GO
TO 9800
9150 RETURN
9800 CLS : PRINT "You have an er
ror in line ";: BEEP 1,1: STOP
9999 STOP
9999 SAVE "FSGE AFEND" LINE 1: B
EEP 1,1: STOP

```

S.D. Lemke is the author of a comprehensive graphics-design program called "PIXEL SKETCH AND GRAPHICS EDITOR 2068 (ver.2)", which offers the user a variety of graphic aids and special effects, with print-out to the TS2040 or TASMAR and AERCO Interfaces. The program sells for \$19.95 +ppd. from: Lemke Software Development, 2144 White Oak, Wichita, KS 67207



AERCO USERS COLUMN

by Dennis Jurries

Still no new update from AERCO, so let's see what has been discovered since the last issue.

The VAR option will save all variables, but they must be assigned to the same variable name (i.e.; D\$), and will not work right if several variable names are involved (i.e.; A\$, i, and C\$). The reason this seems to be is that when all of the variables are reloaded into the computer, the computer doesn't seem to be able to determine which of the variables belong to which name, when more than one variable name is used (or when an array is used).

This brings us to PRO/FILE 2068 by Thomas B. Woods. If you change the following lines, you will be able to use Pro/File on the Aerco Disc Drive System:

```

107 DELETE last LOAD part and add - LET
f$=f$+".VAR""; MOVE f$; BEEP .5
,30: BOTO 1

```

```

5510 last part - LET f$=f$+".VAR""; IF
y$="" THEN CAT f$,

```

Change the Pro/File loader program from LOAD "pro" to CAT "pro.BAS", and from LOAD "p/f" to CAT "p/f.BIN",. To use once the program is loaded, ENTER NN off of the main menu, and then ENTER your file name that you wish to load or save. After entering the new file name for a new file, or for a file update, type SAVE or LOAD (whichever the case may be).

In the Jan/Feb 86 issue of TDM, a typo was made in the conversion of the listing # 1030. There should be a comma at the end of the line.

Due to a shortage of space, the command comparisons between the Aerco, Zebra, Ramex, Oliger (as well as the Larkin) Disc Drive Interfaces will be in the next issue.

THE PORTUGUESE CONNECTION

by John W. Gaddis

USERS COI MMN FOR ZEBRA
FDD and new FDC-3.00
DISK DRIVE SYSTEMS

Now I know what your thinking. You want to buy one of those new Portuguese Disk Drive Systems, but you have a lot invested in your cassette software. You feel that you would have to use the cassette anyway, to run your favorite programs. Well, as you are about to find out, buying a Portuguese Disk Drive may be the best investment you can ever make for your 2068.

Once you start to use the Disk Drive and witness the speed of which you can access files, not to mention save data to disk, and retrieve your data using random access...you will want to give your cassette a decent burial and start computing in the 20th Century.

But all this talk would be meaningless, unless you could convert your cassette software to disk. This column will help you to convert four Timex programs to disk; VU-3D, VU-CALC, VU-FILE, and Timex CHESS (a personal favorite!).

Now all of your personally made software is very easy to convert. All you have to do is put a * (asterisk) after your I/O command. In otherwords, SAVE now becomes SAVE*. LOAD becomes LOAD*, and SCREEN\$ becomes SCREEN\$*. It is just that simple. With that small amount of information in mind, you are now ready to begin to convert all of your cassette-based software to disk.

First, you must load the entire program to the computer. Once the program is loaded, you must now break into the program to the BASIC listing. The easiest way to do this is to tell the program you want to load a file into it. Once you do this, the program will begin looking for a file. It is now ready to break. When the program begins the loading process, do not load a file. Instead, hit the BREAK and the CAPS SHIFT keys together and keep them down until you get the "K" cursor. Now you are ready to change the BASIC, so the software will run on disk. You

may have to do an INK 7, because the INK value may be the same as the paper value.

On all of the Timex programs, you will have to remove one command. This will be the LOAD SCREEN\$ command, and it is found in: line 10 on VU-CALC, line 50 on VU-FILE, line 9 on VU 3D, and line 20 on CHESS. Make sure to DELETE only the SCREEN\$ part of the program. Leave the rest alone.

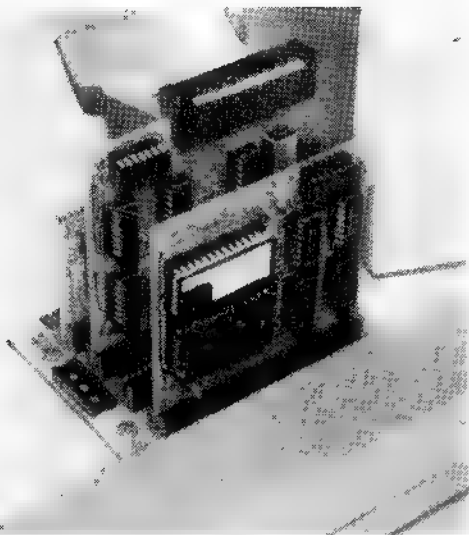
After you have finished that, change all the SAVE's and LOAD's to SAVE* and LOAD*. They can be found at: lines 10, 1000 and 4000 on VU-CALC (change LOAD ""CODE to LOAD* "Calc.code"CODE on line 10); lines 50, 1005 and 2000 on VU-FILE (change LOAD ""CODE to LOAD* "File.code"CODE on line 50); lines 9, 11, 12 and 13 on VU-3D (change LOAD ""CODE to LOAD* "3D.code"CODE on line 9); lines 20, 40 and 70 on CHESS (change LOAD ""CODE to LOAD* "chess"CODE on line 20).

Believe it or not, that is all the modification you have to do to run these programs on your Disk Drive. Now all you have to do is SAVE them to disk. Here is how you do that. For VU-CALC: SAVE* "Vu-calc" LINE 10 (on OK, type SAVE* "Calc.code" CODE 29327,5054). For VU-FILE: SAVE* "Vu-file" LINE 50 (on OK, type SAVE* "file.code"CODE 28287,6144). For VU-3D: SAVE* "Vu-3D"LINE 9 (on OK, type SAVE* "3D.code"CODE 30719, 34816). For CHESS: GOTO 40 (easy one).

There you have it. Four of the original 2068 software cassettes on tape. I am sure that you have others that with the knowledge of what you just learned, can be put on disk. REMEMBER: this column was written to help people who have paid their hard-earned money for these programs and not for the benefit of software "pirates". It is my hope to help the consumer, and not the low-lifes who have no respect for the hard work a person puts into making a good quality program.

The Oliger 2068 Floppy Disc Interface

Reviewed by Dick Wagner



The OLIGER 2068 FLOPPY DISC INTERFACE is manufactured by the JOHN OLIGER COMPANY, 11601 Whidbey Dr., Cumberland, IN 46229. The cost: Assembled/Tested version- \$177.90, and kit version- aprox. \$144.90 (prices include postage). The Disc Operating System (DOS) is called JLO SAFE (Simple And Fast Extended) Disc BASIC.

This disc drive system interface will support 3", 3½" and 5¼" floppy disc drives for the T/S 2068 computer. The drives may either be single or double-density IBM type. The system is readily altered in BASIC to accommodate head step rates from >0 to 30 ms and number of tracks per side from 10 to 250. The interface will operate one to four drives, and is powered by the computer.

The hardware consists of a mother board **23** (3 3/4 x 4 3/8), that plugs into the rear

computer port. It includes 4 circuit board slots, and a "feed-thru" port that duplicates the computer's rear port. Two boards ("A" and "B") plug into any of the 4 slots. Board "A" (3 1/4 x 3 1/2) provides the disc drive cable connector. This board also contains the IC gates (mainly for the address lines), output buffers to the disc drive, an 8 MHz clock, and the WD 1770 FD Controller/Formatter IC. This chip is a special device making the system's design possible. This board also includes RGB circuitry.

Board "B" (3 1/4 sq.) carries an EPROM (the operating program), gates and buffers, and a 6264 SCRAM (an 8K of buffer memory, static RAM) IC. Where essential, the circuit boards have gold-plated edge traces and socket fingers. The mother board has 4 feet to level it. (Note: This evaluation of the Oliger Interface was accomplished with the following equipment~ T/S 2068, A&J Micro Drive and printer I/F, T/S 2040 printer, an Olivetti PR-2300 printer, a TV, and an AMDEK Model Three 3" Disc Drive unit).

Documentation is provided for assembly of the kits, testing the assembled boards, disc drive operation, and checks for proper switching of drive 0 and 1. A simple but effective program is furnished for a menu that loads the desired program from disc by number selection.

The JLO SAFE disc BASIC commands are adequate to operate the system, but future up-dates (and the proposed KINGSLEY DOS) will provide additional simple commands. Besides the formatting commands, there are commands for SAVE, LOAD, and printer select which requires a printer interface, or 2040 (Note: John Oliger has available an optional printer I/F board, that is compatible with the Aerco interface).

There are two SAVE commands. SAVE /O works only on about the first 1 1/2K of disk memory on each side. This is reserved for menu program storage. SAVE /n saves the entire state of the machine to disc. "n" is any number of 1 or greater, depending on the drives. For 40 tracks single-sided, the

limit is $40/10 = 4$. The "/" is common to all commands. No extra space or character can be in front of it.

Several other useful features include the status of operations, which is useful for trouble-shooting...and formatting can be accomplished without losing a program in the computer's memory (a big advantage to not using the computer's RAM for disc operations).

The only problem experienced, was of my own making. In going thru the steps in formatting, I was aware that I was using an 80-track drive, so I used this figure for the number of tracks. Several loading errors made me review things, and in the instructions on commands, I found that this figure was "per side". If I had read this section before starting, this problem would not have surfaced.

I do have a suggestion for improved documentation: that the reader be directed to review the command section before starting the section on Testing and Using. Also, some of the information in the price sheet data would be good to have in the manual.

A disadvantage (which may be common in other disc systems) is that only 4 files per side can be saved with 40 tracks. Double-density gives a maximum of 92K bytes per side, so there can be a single file to about this length.

I tried some operations common to my usual computer use. TASWORD TWO was easily converted from Micro Drive commands to this system. I also tried a Zebra OS64 Cartridge, with no conflict. Because this system stores in blocks, speed of SAVE and LOAD is near the limit of the drives, about 50K. PRO/FILE LOADS in 4 seconds, and this program is near memory capacity!

For those interested in this interface, I recommend a letter to John Oliger for details and prices. Also ask about a new development: data transfer between disks, COPY, and SAVE with just a press of a button!

You Too can be an ARTIST

Software Reviewed by Michael E. Carver

A recent release for the Spectrum computer can turn your computer into an easel and palette. The ARTIST, by Bo Jangeborg and published by SofTechnics, is an excellent tool for artists, or even aspiring artists. I have been looking for such a program ever since I had an opportunity to experiment with the MacIntosh MacDraw. Even though I took an art class in high school, I never really advanced beyond stick-figures. A computer-based art program is the only medium I have felt comfortable with (my reasons for writing PABLO PIXEL-O, as seen in the Sept/Oct 85 issue of TDM). Enter The Artist...

The Artist allows the user to draw directly on the screen by free-hand, or by using straight lines and expertly crafted

arcs and circles. Throughout the program, a menu is displayed on the bottom three lines of the screen, making this program very user friendly. Upon loading, a blank screen (32 characters by 24 lines) is provided with two cursors, one "pen" cursor and a cross-hair cursor for reference. (Note: To draw on the bottom of the screen the picture is scrolled up 3 lines.) The cursor is moved by four keys ("Q" = up; "S" = down; "R" = left; "T" = right). I found this arrangement quite awkward at first, but with a little practice I was able to move my pen quite easily. At first the cursor moves slowly, but as the key(s) are held down the speed increases. In order to draw or erase, one must also hold down the "C" key or "X" key respectively. I



TOP TEN OF 1985

Reviewed by R. Lussier

[Editor's Note: R. Lussier has perhaps more Spectrum programs for his 2068 (with ROMSWITCH) than anyone else we know of...over 300! Therefore, when asked to pick the ten best personal Spectrum favorites of 1985, here is what he came up with...]

SPY HUNTER (Sega): This program follows the arcade original fairly close and is just as addictive. The graphics are very good.

STARION (Melbourne House): This program also has very good graphics. The idea is to zap the aliens, after which the explosion of their ship turns into a letter (character). You have to collect them and spell anagrams, then put them in the right historical time zone. This is a zap-em game and also an educational game all combined into one. Very good and addictive.

MONOPOLY (Leisure Genius): The original version by Parker Bros., but uses British names and streets, ect. The graphics are very good (the dice are 3D...look and roll like real ones). For up to 6 players. This is a must for Monopoly addicts and people who like board games.

BUGGY BLAST: A sophisticated and powerful space/ground attack vehicle fitted with the latest weapons and defence systems. The graphics are super, and the game is very fast and addictive. A must for the zap-em crowd.

LETASET (Eclipse): This is a utility program which has 18 different font types, which you can use with the printer and your programs. Some styles included are Shadow, Pump Knight and Dragon, ect. This is a very good program in which you may also stretch and squeeze the letters to different sizes.

ASTRONOMY COMPILATION (Skysoft): This new program has 11 sections; such as Starmaps, Constellations, Halley's Comet, ect. This is one of the more useful Astronomy programs I have used. Good graphics and a COPY feature for the T/S 2040 printer.

RED MOON (Level 9): This is a graphics type adventure game from Level 9, who are very well known for their adventure programs. This has 200 locations, all with graphics and the option to turn the graphics off. One of the top adventures for 1985.

QUIZTIMER (MacMillan): This is a unique multi-feature quiz-type game with "not-so-bad" graphics, and the option for turning them off. Also you can set the time for answering the questions. Has one or two player option. The game has 10 quizzes, each with 100 questions. There is a printer option, and is Microdrive compatible. Very good and educational. Great for adults, and the kids will love watching the graphics being built.

TROPICAL FISH KEEPING (David Foster): This program uses very good graphics to teach the care of Tropical fish. The program is in two parts. In the first, it teaches about the equipment and care of it (setting up the aquarium). The second teaches about foods, disease (types and cures), and a very good section on different types of fish (by name, sizes, and survival levels). This is a must program for people interested in the up-keep of tropical fish.

GLASS (Quicksilver): In this program you have to destroy 3 enemy bases by going through a series of 14 different screens. A very fast and addictive game. The graphic-screens are just fantastic! They have to be some of the best graphics ever done on the Spectrum. This game is rated very high in Britain.

If you are interested in any of the above programs (the prices, addresses of companies that have them, ect.), you can write to me at: 7937 Elwell St., Burnaby, B.C., Canada V5E 1M3 (Include S.A.S.E.).

A MINI SOLUTION TO A MAXI PROBLEM

by Duncan Teague

I'm about to ask a foolish question to those who have purchased Spectrum software for use with T/S 2068's. Have you ever had any difficulties in trying to load Spectrum programs? Of course you have. Some programs just will never load properly.

The Spectrum doesn't require as high a volume to load programs as does its American counterpart. So many Spectrum programs are recorded at much lower volumes than most T/S software. Lower recording volumes also make it more difficult for "pirates" to copy such software.

Radio Shack has an inexpensive solution to this problem. It is a small "Mini Amplifier/Speaker." It costs \$11.95, and the part number is 277-1008. Be sure to get a nine-volt transistor radio battery free with the "free battery card" they always offer you.

The Mini Amp has a combination on/off and volume control knob. It also has input and output jacks that match the cassette cables you use with your T/S 2068. With judicious routing of the twin leads on your cassette cable, you won't need anything else.

Start with low volume levels, and gradually increase the volume on the Mini Amp until your program loads. When you finish loading, turn off the volume on the Mini Amp. It continues to drain the battery unless you do. Higher volume levels drain the battery more quickly than do lower volume settings.

If this sounds deceptively simple and too good to be true, it is. The \$11.95 price tag is probably less than the cost of that Spectrum program you haven't been able to load, so it will pay for itself the first time you use it.

Not many peripherals can make that claim.

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AERCO FD-68 Conversion Programs for Mscript and Omnicalc 2 (v. 64000). On 5.25" double density disk or tape, \$9.00 ppd. each. Chia-Chi Chao, 73 Sullivan Drive Moraga, CA 94556. SASE for info.

DERBY DAY - 2068. The nonpareil racing game. Unparelled fun & excitement for ages 4 to won't tell. Prints tickets on TS-2040 & can be used as a fund raiser. \$10. Ron Ruegg, 37529 Perkins Road, Prairieville, LA 70769.

FOR SALE: Timex Sinclair 1000 Computer (2K), Timex-1000 Software, Timex-2068 Software, Spectrum Software. Write: Dane Stegman, 26 Marshall Avenue, Akron, NY 14001

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MONEY MACHINE. Exciting new word game for the T/S 2068. May be habit forming. From ABBA Soft. Tape \$10; Llist \$3, ppd. Herb Bowers, 2588 Woodshire Circle, Chesapeake, VA 23323

FOR SALE: Memotech Keyboard with buffer. \$30.00 via UPS, on receipt of Money Order. Buffer fits on card at rear of TS 1000/1500 with feed-thru for other units. A.L. Francis, 12995 6th St. #42, Yucaipa, CA 92399.

SOFTWARE for the Timex 2068. Send a S.A.S.E. for a free catalog to: TIMEWARE, 1907 1/2 West Genesee St., Syracuse, NY 13204

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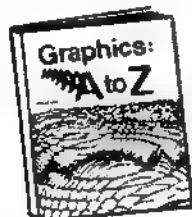
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GRAPHICS A to Z

A GRAPHICS MANUAL JUST FOR YOUR TIMEX.



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- using a compiler
- with Memotech's HRG

No matter where you are in programming skills or how much memory or peripherals you own, you will find this manual very helpful indeed. Learn how to speed up your graphics in BASIC if that is what you are into... or suit them to the quirks of a "compiler". Learn to get the most from your computer with Machine Code techniques. These are not perfunctory overviews, but advanced M.C. techniques of screen control and multi-character animation. Memotech's HRG is further explained and secrets uncovered.

The manual contains over 80 listings, some in Basic some in Machine Code and each with a screen display sample. All are ready to run. Each illustrates innovative methods to push your programs with fantastic graphics. Drawing any size cube in 3-D at the touch of a key, turning your screen into a canvas, drawing charts and graphs, moving complex animated shapes, scrolling things in 3-D, using memory to store pages to use later as an animated flip book, and on and on.



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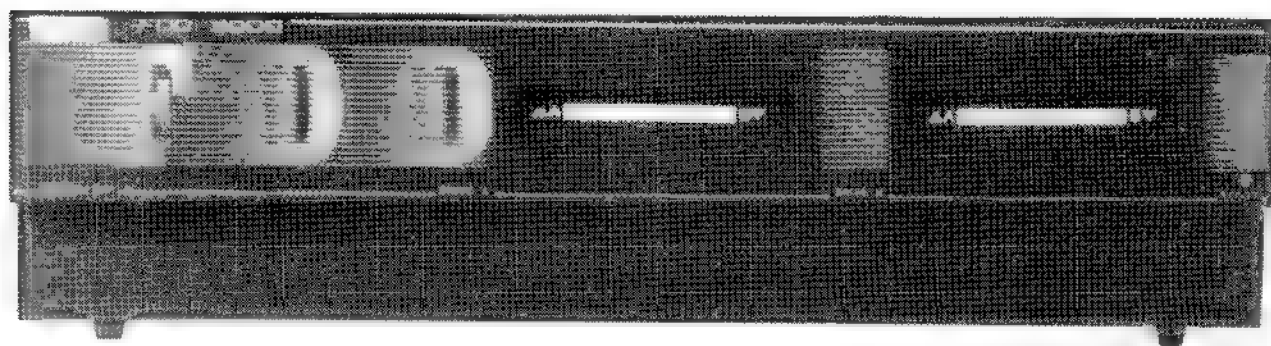
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The best Disk System for the TS2068 just got even better! The FDD-3000 for the TS2068 retains all the features and compatibility with the original Zebra Disk System. The FDD-3000 contains the Power Supply, FDD Controller, and space for 1 or 2 disk drives in a compact attractive black metal case. This case is sturdy enough so that you can place a monitor or small portable Television on top to give that IBM-like high-tech appearance. The FDD-3000 features the same Intelligent Controller as the original FDD, but with an expanded Internal RAM of 64k. Yet it is still 100% software compatible with the original FDD.

Like our original Disk System, the FDD-3000 is compatible with all of your existing TS2068 peripherals including the TS2040 and Alphacom/32 thermal printers, the WC2050 modem, Aerco CPI, Tasman CPI, A&J Microdrives, Zebra Talker, Zebra Graphics Interface, Z-Stick, Z.A.D., OS-64 Cartridge and more! The FDD-3000 is available in one-drive and two-drive models. Each drive stores 180k of data per side of a diskette for a total of 320k per disk.

FDD-3000 64k CP/M 2.2 Option

Available as an option to the FDD-3000 is the 64k CP/M 2.2 operating system from Digital Research. While the FDD-3000's T.O.S. operating system is one of the most powerful disk operating systems available for a personal computer, the CP/M option for the FDD-3000 will let you access the large library of CP/M-80 business and personal software.

The CP/M 2.2 option includes a terminal emulator program which allows your TS2068 to run CP/M in 64 column mode (High-Res Amber or Green monitor recommended.). A Driver is included to use your 80-column printer from CP/M through the FDD-RS232 port.

FDD-3000 Spectrum Mode Option

An additional option is available for those who wish to run Spectrum software on their FDD-3000. When coupled with a Spectrum Emulator it allows you to LOAD, SAVE, and RUN Spectrum software from FDD-3000 Disk.

FDD-3000 Single Drive System

Single Drive starter system includes: FDD-3000 with One 3" floppy drive, TS2068 Interface, T.O.S. operating system disk, and user's manual

Catalog #: C550 FDD-3000-1 Price: \$375.00

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Same as above, but with two 3" disk drives

Catalog #: C551 FDD-3000-2 Price: \$425.00

FDD-3000 64k CP/M 2.2 Option

Includes 64k CP/M 2.2 System Disk, 64 Column Terminal Emulator, and user's manuals.

Catalog #: C552 FDD-3000 CP/M Option Price: \$50.00

FDD-3000 Spectrum Mode Option

Switchable option to allow FDD-3000 to operate in Spectrum Mode. (Requires Spectrum Emulator, not included.)

Catalog #: C553 FDD-3000 Spectrum Option Price: Cal.

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The price of our untested & uncased modem boards is so reasonable that not only are they being used as modems, but also the boards and sometimes just their parts are being put to many other uses by creative Timex hobbyists and experimenters. One of the things we've done at Zebra Systems is develop a very simple circuit to change one of these Modem boards into a general purpose RS232 board, which can then be used to drive serial printers and other devices. We thought the idea was so simple and cost-effective that we're making it available as a product.

We are introducing a complete kit consisting of a small printed circuit board, 3 IC's, a DB-9 connector, other miscellaneous parts, and instructions. The board develops the negative voltage required for true RS232 and has proper Driver and Receiver chips. After installing our RS232 board with a pin and socket system right onto your modem board's 8251 Serial chip, all that remains is to make 3 trace cuts and add one jumper wire to complete installation. Clear instructions are provided with a discussion of the theory of operation and some simple BASIC and assembly language printer drivers.

A short experimenters guide to the WC2050 is included. It explains such things as how to change the address decoding to other port assignments, how to change baud rate under software control, and more.

The WC2050-to-RS232 Kit (Catalog #: C183) includes all parts and instructions necessary for installation and operation. A bare board for the modification is also available.

Catalog #: C183 WC2050-to-RS232 Kit Price: \$19.95

Catalog #: C184 PC Board and Instructions only Price: \$ 5.95

AS-IS ZX81 COMPUTERS

Many months ago we purchased a large quantity of returned ZX81 computers from a Sinclair Repair Depot. These computers were sent back to Sinclair for repair (in some cases by owners who simply could not load tapes or operate the computer properly). These computers are offered on an AS-IS, NO-RETURN basis. We've been selling these returned computers to members of local Timex clubs who have reported that a large number of these ZX81 are already working, or can be easily repaired.

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LAST 100 WC2050 MODEMS

Zebra Systems has purchased the entire remaining stock of fully assembled and tested WC2050 modems from Anchor Automation. These modems come complete with power supply, MTERM I software on cassette (see below), user's manual and a one year limited warranty from Anchor Automation. Hurry less than 100 units left!

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ZEBRA PUBLISHES MTERM

Zebra Systems has purchased the rights to publish the MTERM series of Terminal software for Timex computers with WC2050 modems

MTERM/T for the TS1000/1500/2068

MTERM/T (also known as MTERM I) is a smart terminal program which has the following features: auto-dialing of phone numbers, change modem parameters, change Border, Ink, and Paper colors (TS2068 version only). MTERM/T is supplied on tape with user's manual.

Catalog #: ST01

MTERM/T

Price: \$12.95

MTERM II for the TS2068

MTERM II is an advanced software package for your TS2068 equipped with the WC2050 modem. MTERM II features a 14 Number Auto Dial Directory, 27k Send/Receive buffer which can be erased, viewed, printed, or transmitted, 10 Macrokeys which hold up to 55 characters each for auto logon, codes, etc.. You can transmit and receive BASIC programs, and text from a BBS or another TS2068 Computer. MTERM II is also available on fast-loading Zebra Command Cartridge format.

Catalog #: ST02

MTERM II Tape

Price: \$29.95

Catalog #: ST2C

MTERM II Cartridge

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The Complete Guide to MTERM II By Barry Carter

This book tells you all you wanted to know about MTERM II. It details many features of MTERM II that were left out of the manual. A MUST-HAVE book for MTERM II owners!

Catalog #: C189 Complete Guide to MTERM II

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MINI XMOD 1.7 for the TS1000/1500

MINI XMOD 1.7 allows your Timex 1000/1500 or ZX-81 equipped with a Westridge 2050 modem to Up and Download programs to any XMODEM Protocol BBS (Like ZEBRA BBS). Includes 16k and 64k versions on cassette and User's manual. Requires a minimum of 16k of RAM.

Catalog #: WE01

MINI XMOD 1.7

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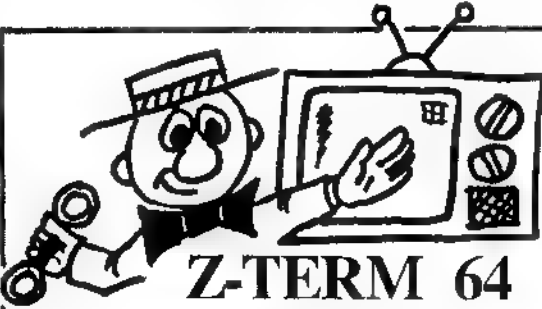


Z-CLOCK

Clock/Calendar
for your TS2068

The Z-Clock's built in battery back-up feature lets you keep track of time even when your computer is turned off. When you turn on your TS2068, the Z-Clock can tell it the YEAR, MONTH, DATE, DAY OF THE WEEK, and the TIME OF DAY down to tenths of a second with crystal controlled accuracy. The clock is easily accessed from BASIC or assembler. The Z-Clock features a 64-pin bus extension connector.

Catalog #: C400 Z-Clock Price: \$39.95



Z-TERM 64

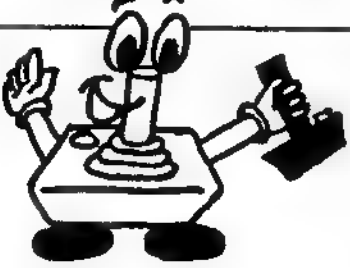
64 Column Terminal Program

When we started shipping our OS-64 64-column operating system cartridge, the most often asked question was: "Will MTERM II work in 64 columns with OS-64?". Unfortunately, the answer was no. But now Z-Term 64 has arrived! And not only does it support 64 column operation, but also the entire list of most often requested modem features including: clearer menus and documentation than MTERM II, Auto re-dialing, built-in text editor, expanded upload and download features including ASCII conversion of BASIC programs, Xmodem protocol, and built-in 80 Column printer support for on-line printing. Z-Term 64 also supports ZEBRA Disk, A & J Stringy Floppy, and Cassette for storage of downloaded programs, text and data. Supplied on cassette with user's manual (Requires OS-64, NOT INCLUDED) NOTE: Neither Z-TERM 64 or OS-64 support the 32 column TS2040 or Alphacom/32 thermal printers.

Catalog #: C278 Z-Term 64 Price: \$29.95

OS-64 64 Column Operating System Cartridge

Catalog #: C271 OS-64 64 Column Cartridge Price: \$29.95



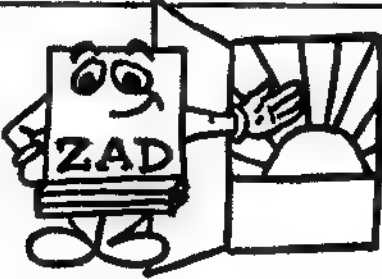
Z-STICK

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Compatible
Joystick
Interface

Zebra Systems is happy to introduce Z-Stick, the ideal companion to your Spectrum Emulator. Z-Stick is a joystick interface for use with Spectrum game software on a TS2068. Because Z-Stick is compatible with the famous Kempston Joystick Interface so popular in Great Britain, it is supported by the majority of British Spectrum Game Software. But that's not all. While our engineers were at it, we decided to throw in some additional features to add to your enjoyment. The Z-Stick includes two jacks for SOUND and BEEP; an L.E.D. power-on indicator so you can tell if you've left your TS2068 on even if your TV is off; and a computer reset switch to save wear and tear on both you and your computer's power switch. For those who don't already own a Spectrum Emulator, we have the Z-Stick PLUS, which includes a Spectrum Emulator for just \$10.00 more.

The Z-Stick interface works with your Timex TS2090 joystick or any Atari compatible joystick. Z-Stick attaches to the rear expansion-connector of your TS2068 and features a full 64-Pin feed-through expansion connector for maximum compatibility with your other TS2068 peripherals.

Catalog #: C401	Z-Stick	Price: \$29.95
Catalog #: C402	Z-Stick PLUS	Price: \$39.95
Catalog #: C121	Atari Compatible Joystick	Price: \$9.95
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Z.A.D.

Zebra
Analog
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Experimenters rejoice! You can now get an inexpensive 8-Channel Analog-to-Digital interface for your TS1000, TS1500, TS2068 or ZX81 that opens the door to the real world. The manual includes sample applications and I/O software. Z.A.D. features a 46-pin feed-through connector for peripheral expansion. Each A to D channel has 8-bit resolution and 0-5 Volt full scale range. There are many good application suggestions for using A to D's in the following two books also available from Zebra Systems: Computer Interfacing Techniques in Science, Powerful Projects for the Timex/Sinclair

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TS 2068 DISC SYSTEM

FD-68 INTERFACE

Controls 1-4 drives

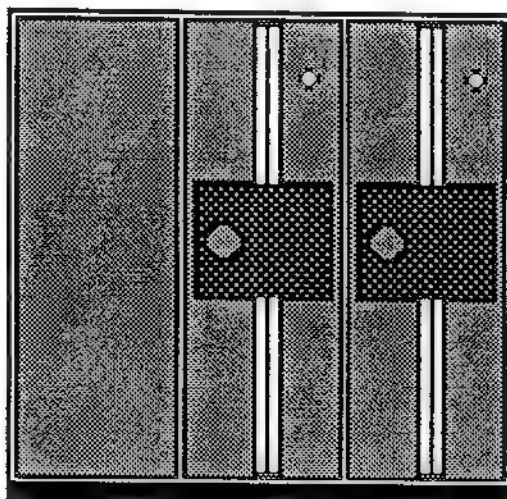
3 inch to 8 inch drives
Shugart compatible

Single or double sided

40/80 tracks per side

64K RAM (256K opt.)
& 8K ROM on board

RGB monitor output



SYSTEM COMPONENTS

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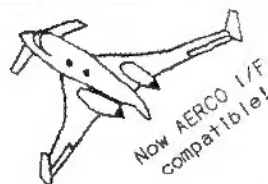
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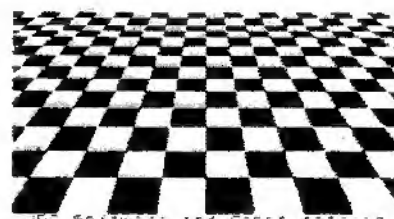
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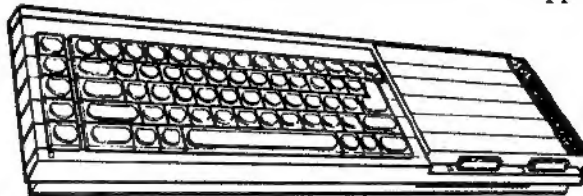
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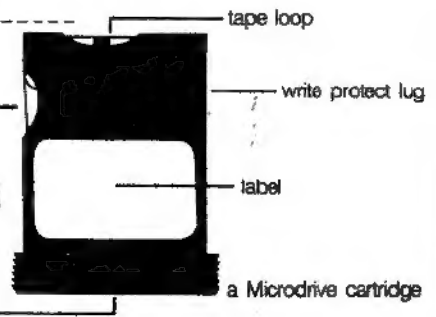
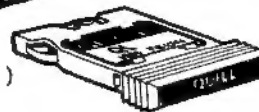
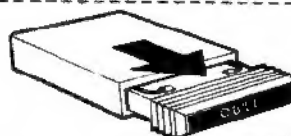


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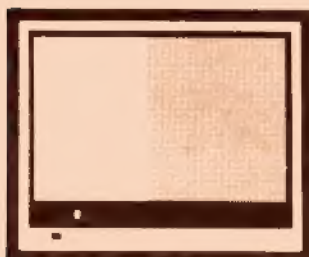


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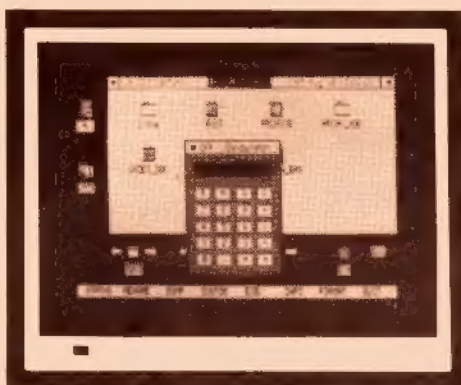
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